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The American

GAS LIGHT JOURNAL.

(ILLUSTRATED.)

DEVOTED TO THE INTERESTS OF

ILLUMINATION, HEATING, MECHANICAL, CHEMICAL

AND

GENERAL SCIENCE.

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[OFFICIAL NOTICE.]

Instituting "Wrinkle" and "Novelty Advertising" Departments, Ohio Gas Light Association.

OHIO GAS LIGHT ASSOCIATION,
OFFICE OF THE SECRETARY,
DELAWARE, O., Dec. 7, 1900.

For the seventeenth annual meeting of the Ohio Gas Light Association, which is to be held in Dayton, O., March 20th and 21st, 1901, the Executive Committee has created two new features, viz.: A Wrinkle department, for which Mr. Henry L. Doherty, President Denver Gas and Electric Company, Denver, Col., has been named as Editor; and a Novelty Advertising department, which will have for its Manager, Mr. B. W. Perkins, Superintendent South Bend Fuel and Gas Company, South Bend, Ind.

These departments should prove very attractive for the meeting. Their success, however, depends largely upon the active co-operation of the members. It is, therefore, earnestly hoped that the fraternity will not be backward in sending Wrinkles to Mr. Doherty and "Advertising Schemes" to Mr. Perkins. T. C. JONES, Secretary.

THE THIRTY-FIRST ANNUAL MEETING OF THE NEW ENGLAND ASSOCIATION OF GAS ENGINEERS.

It is certain, failing more signs, that another year for the gas man is well underway, in that before us is the initial circular, by Secretary N. W. Gifford, respecting the Thirty-first Annual Meeting of the New England Association of Gas Engineers. Those of a retrospective turn of mind might be forgiven for asking, can it be the New England Association is announcing its 31st year, at the outset of the Twentieth Century, while the industry which it so well represents in technics and fraternity is but little over 100 years of age? Retrospection or introspection to the contrary, the fact remains that the industry is something over the age of a century, and that the New England Association of Gas Engineers is going by its 31st year. It must amuse veterans like Slater, of Providence; Harbison, of Hartford; Farnham, of Lowell; Leach, of Taunton; Sherman, of New Haven; Gerdenier, of Bridgeport; Lamson, of Worcester; Coggshall, of Fitchburg, and others—for the roster must terminate somewhere—of the old guard of the Eastern gas end to look back, and so bring to memory's eye, and to mind's thought, the days of yore in their own gas fields. Selling rates were high and condition of plants was low. In their early engineering days, their financing men were quite as eager for voluminous capitalization as are the financing gas men of to day; but, despite the increase in the number of people to be served, or that should be served, we think it is fair to say that to day's gas financiers are hungrier for dividends, or "stocks," than were those of the first times of the veterans named. However, those speculations are of no particular avail at the moment, unless they may be made to point the lesson that, over and above the greed of the gas investor of the early days, and comparing the greed of the present day gas investor with that of his predecessors, the practice of gas engineering is a stable one. And, to carry the thought a bit further, that no other section of the country than New England affords a better exemplification of such stability, even if a sporadic example of following the lead of false gods can be cited at Everett, Mass., or elsewhere. So much for speculation;

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now for the simple facts. According to the announcement of Secretary Gifford, the 31st annual meeting of the New England Association of Gas Engineers will be held in Young's Hotel, Boston, Mass., February 19th and 20th. This notice means something of a change from the time set in the ordinary practice of the laws of the Association for the assembling of the meeting, but we presume the Lenten dates are responsible for the change. Going on with the details, the meeting as usual will be held in Young's Hotel, and the proceedings thereof will be directed by the President, Mr. Walter R. Addicks. Secretary Gifford has been up and doing respecting the technical preliminaries; for in response to a circular issued some time ago to the members, the appended list of subjects for discussion was prepared Regarding the list the Secretary makes this appeal: "Will you kindly give this list your careful scrutiny and see to which of the subjects you can contribute to the information of the meeting, from your fund of knowledge and experience, either by preparing a paper or short monograph; or by taking part at the verbal discussion of some particular topic at the meeting. From this list you may conclude that there is promise of a very interesting and profitable meeting, if the members come prepared to attack the problems presented in an effective manner." The subjects for discussion so far are these:

"Workings of the Everett Gas and Coke Plant."

"Inclined Retorts."

"Gas Handling Plant: From Hydraulic to Holder."

"Gas Governors: Street, Service and Burner."

"Gas Engines."

"Conveyors; for Hot Coke; for Oxide."

"High Pressure Candle Powers."

"External Corrosion of Steel Holder Tank Bottoms."

"Efficiency of Air Pyrometer as an Oil Saver on Water Gas Set."

"Patching the Lower Retort below the Middle in a Bench of Inclines."

"Various Apparatus, Methods and Results of Putting Oxygen into Gas for Purification Results."

"Wrinkle Department."

"Data from Coal Gas Works to Determine the Most Efficient Form of Condenser, and which Gives Best Final Candle Power."

"Consumption of Steam in Coal Gas Works, in Engines, Pumps, Drawing and Charging Machines, etc., per 1,000 Cubic Feet of Gas."

"In Coal Gas Manufacture: Does It Pay to Work for Highest Yield; or Should Greatest Number of Candle Feet be Sought for?"

"What is the Average Boiler Fuel per 1,000 Cubic Feet of Gas Made in Coal Gas Works?"

"Is the Use of the Prepayment Meter Increasing; and Does It Pay?"

"What is the Average Weight of Retort Coke per Bushel?"

"What is the Standard Screen which Breeze should Pass Through?"

This list should induce thought and evoke speech, and Secretary Gifford suggests that those who may be unable to attend the meeting might think up any one of the named subjects and forward to the sessions his thoughts thereon. The list is a formidable one, and points notably towards a vivid awakening over the "intricacies" connected with the manufacture of coal gas; and it also points to the fact that the oldest American Gas Association is quite vigorous for the best promotion of the industry from an engineering point of view.

NOTES.—Practical reminders that the old year and the new century are no longer in company constantly come to hand. In the receipts we note a handsome vest pocket diary from the Keystone Meter Company; an attractive and useful calendar—memoranda pad from the Grand Rapids (Mich.) Gas Light Company, the "get-up" of which one up-a-tree may fairly charge to the designing of Manager Doty; a handsome sheet calendar from the Laclede Firebrick Manufacturing Company, of St. Louis; and a goodly representation in photograph of the works of the Parker-Russell Mining and Manufacturing Company, of St. Louis.——At the meeting for the reorganization of the Seattle (Wash.) Gas and Electric Company the officers chosen were: Trustees, William H. Dunwoody, J. T. McChesney, Samuel Hill, Jas. Goldsmith and C. R. Collins; President, Samuel Hill; Vice-President and Treasurer, J. T. McChesney; Secretary, E. F. Wells; Consulting Engineer, C. R. Collins. Mr. Collins resigned the position of Secretary and General Manager to the Company some months ago, in order to engage in the business of Consulting and Constructing Engineer in a general way. His offices are in the New York Block, Seattle. He is sure to make a success of it no matter on what line he elects to travel. ——The residents of Chester, Pa., are very appreciative of the reduction in the net gas rate to $1 per 1,000, made the first of the year by the Delaware County Gas Company.

[From the Louisville *Courier-Journal.*]

Text of the Decisions by the Court of Appeals, State of Kentucky, in the Matter of the Status of the Kentucky Heating Company to the Gas Supply of Louisville.

Below are given in full the decisions of the Court of Appeals in the two collateral issues arising from the injunction granted by Judge Toney in the suit of the Louisville Gas Company against the Kentucky Heating Company, in which he enjoined the Kentucky Heating Company from distributing, selling or using natural or artificial gas, or a mixture of the two, for illuminating purposes. The appeal from Judge Toney's decision, which will finally ascertain the relative rights of the two companies, is now pending in the Court of Appeals.

The first opinion related to a contempt rule against the Kentucky Heating Company to show cause why it should not be punished for contempt for having disobeyed Judge Toney's decision. In the opinion the response to the rule is held to be insufficient, and the opinion states as to Judge Toney's opinion that it "is the duty of this court to enforce obedience to it. In this we have no election."

It is further added that it "is also the duty of all good citizens to cooperate with it (the court) in any way in securing this obedience, and all those who obstruct it in any way in obeying the judgment are in contempt of this court, no less than the appellant."

The second opinion is in the injunction suit of Robert Nairin, a consumer of the gas product of the Kentucky Heating Company and representing other consumers, to prevent the Kentucky Heating Company from cutting off their gas on the ground that the consumers were using it for illuminating purposes. The injunction was granted by Judge Miller, but the Court of Appeals dissolved it, and it is now the duty of the Kentucky Heating Company to obey Judge Toney's injunction and, if necessary, cut off its gas from its consumers unless they use it only for heating purposes.

The opinions are:

Court of Appeals of Kentucky, Dec. 21, 1900.—Kentucky Heating Company, appellant, *vs.* Louisville Gas Company, appellee. Appeal from Jefferson Circuit Court, C. P. Division. Opinion of the Court by Judge Hobson.

The court below, by its judgment entered July 17, 1900, perpetually enjoined appellant from distributing, selling or using natural or artificial gas, or a mixture of the two in connection with what is commonly known as the Welsbach burner, or any other mechanical device or contrivance, by means of which illumination is produced, and from supplying such gas to any person or persons, natural or artificial for illuminating purposes. This judgment has not been superseded and is in full force; but an appeal has been prosecuted from it to this court. On November 16 appellee applied to this court for a rule against appellant to show cause why it should not be punished for contempt for disobedience of the injunction. The rule was granted and appellant filed a response to the rule, which on November 28 was adjudged insufficient, and the rule made absolute. Appellee now files affidavits to the effect that appellant, its officers and directors, have not complied with the order of this court and are still violating the injunction which this court required it by its order to comply with, and moves the court to place the appellant company in the hands of a receiver or inflict such penalty as will insure a compliance with the orders of the court. On the hearing of this motion counter affidavits are filed by appellant, in which the efforts made by it to comply with the orders of the court are set out at some length.

We deem it unnecessary to go into particulars, but on the whole case are clearly of opinion that appellant has not obeyed the order of this court and is in contempt. While we realize there are some difficulties in the way of appellant in complying with the order referred to, and it may be that it has not continuously refused obedience to the order, we are satisfied it has not complied with it, either in letter or in spirit. This may be due in some measure to legal proceedings which have intervened and to misconception on the part of appellant's customers as to their rights, and we are therefore loath at this time to proceed to severe measures.

The case has not yet been docketed in this court, and the merits of the controversy are not, therefore, before us. The only thing before us is the judgment of the court below, which is not superseded and while in force must be obeyed. It is the duty of this court to enforce obedience to it. In this we have no election. It is not only the duty of appellant to obey the judgment, but it is also the duty of all good citizens to co-operate with it in any way in securing this obedience and all those who obstruct it in any way in obeying the judgment are

in contempt of this court no less than appellant. Our whole social fabric rests upon the dignity and authority of the law, and its mandates must be respected and obeyed by all.

It is, therefore, adjudged by the court that appellant is in contempt and that this appeal shall stand dismissed on the second day of the next January term of this court, unless on or before that day it shall be made to appear to the court that appellant has faithfully and fairly obeyed the order referred to, and at that time such further orders will be made in the matter of the pending motions as the ends of justice may require.

Judge Guffy not sitting.

Judge Paynter dissenting.

Helm, Bruce & Helm, Matt O'Doherty, for appellant.

Humphrey, Burnett & Humphrey, for appellee.

Jefferson Circuit Court, Chancery Division, Dec. 21, 1900.—Robert Nairin, plaintiff, *vs.* the Kentucky Heating Company, defendant. On application to Judge DuRelle to dissolve injunction. Opinion.

This motion to dissolve the injunction granted by the Chancery division in this case was heard before the whole Court of Appeals, in connection with certain proceedings in the appeal of the Kentucky Heating Company against the Louisville Gas Company.

After consultation the conclusion has been reached that the decision of this motion does not in any way involve a consideration of the merits of the controversy in the case last mentioned, and the merits of that case will, therefore, not be considered or discussed in this opinion, which will be confined to a brief statement of the issues in this case and of the conclusions reached upon this motion.

Plaintiff brought suit praying for a judgment enjoining and restraining defendant from turning off its natural gas from plaintiff's premises or depriving him of the use of same during the pendency of his action. The averments are, that the Heating Company is the successor and owner of the rights and franchises of the Kentucky Rock Gas Company, which, by its charter enacted March 26, 1888, was given "power and authority to conduct natural gas from the lands and property it might own to any of the cities, towns or manufacturing or business places, in the State of Kentucky, wanting the same and assenting to its introduction upon terms and conditions agreed upon * * *." On August 11, 1888, by ordinance of the city of Louisville the Rock Gas Company was given the right, privilege and authority to lay its mains in the streets of that city and make such connections "as might be necessary or needful for the supply of natural gas to the citizens of said city for heating purposes only for the period of 20 years from the date of the passage of said ordinance." It was further provided in the ordinance that the company should furnish natural gas for fuel and heating to the citizens of the city by contract made between the parties, and as soon as practicable establish its works and lay down its mains so as to be prepared to supply the city within 2 years. It was further alleged that the company did comply with the ordinance by erecting its works and laying its mains and has supplied the citizens of Louisville until its franchises were sold under judgment of court to the defendant, the Kentucky Heating Company, which has exercised the franchises of the Rock Gas Company since that date, has extended its mains through many of the streets and alleys of the city, one of which passes in front of plaintiff's place of business; that plaintiff heretofore made application to the defendant for the use of its natural gas and for connection with its said main, which application was accepted by the said defendant; that he has, at considerable expense, prepared his place for the use of natural gas and for a long time past has used the gas supplied by defendant and has complied with all its reasonable rules and regulations, paid its bills and has always been ready and willing to pay all reasonable charges and to obey all reasonable rules and willing that defendant should inspect all pipes running from its main into his premises, and its meter, and has always permitted this, but that defendant now claims not only the right to inspect the pipes running from its mains into its meter, and its meter, but also the right to inspect all pipes running from the meter to any part of his house. There are further averments as to the inconvenience and uselessness of such inspection and that the regulation requiring permission of plaintiff to inspect such pipes is unreasonable, unwarranted and unnecessary. There is a further averment that he has refused to allow such inspection and that defendant has threatened to turn off the gas from his premises, and if that is done it will result in great and irreparable damage and injury to him.

An affidavit of defendant's President was filed reciting the proceedings against defendant for contempt of the injunction of the Law and Equity division of the Circuit Court in the case of the Kentucky Heating Company against the Louisville Gas Company, now pending in the Court of Appeals, and the opinion of the Court of Appeals adjudging the defendant in contempt; that the plaintiff was using defendant's gas for illuminating purposes, and that affiant knew no way of effectively carrying out the judgment of the Law and Equity division except by turning off the total supply of gas when the consumer refused to cease using it for illuminating purposes.

By an amended petition the plaintiff alleged that there were large numbers of consumers of natural gas in the same condition as plaintiff, resisting the right of search and threatening injunction suits similar to this one: "That the questions here presented involve a common and general interest of many persons, who are so numerous that it is impracticable to bring all of them before the court," and praying to be allowed to prosecute this action for the benefit of all such persons. By a second paragraph the amendment admitted that it was true, as stated in the affidavit of Mr. McDonald, "that defendant has been in effect required by the Court of Appeals of Kentucky to turn off its gas from the premises of such of its customers as persist in using said gas for lighting purposes, but plaintiff states that said order was made by said court in a case to which neither the plaintiff nor any of the parties for whom he sues were made parties, and that he is in no wise bound thereby." The third, fourth and fifth paragraphs of the amendment undertake to plead, as against the Heating Company, the claims of the Company in the Gas Company's suit against it—that is to say, set up the Heating Company's claims upon the merits in its controversy with the Gas Company.

An answer was filed, which is, in substance, the affidavit of Mr. McDonald above referred to.

Upon these proceedinge the Law and Equity division of the Circuit Court held the view that Nairin, not having been a party to the case in which the proceedings in contempt were had, was not bound thereby, and "for the purpose of enabling the question to be raised before the Court of Appeals," granted an injunction "restraining the Kentucky Heating Company from turning off its gas from the premises of the plaintiff, or of any other of its customers, on the ground that such customers are using said gas for lighting purposes, or are refusing to permit their premises to be inspected in order to determine whether said gas is being so used by them, until further order of the court."

It will be observed that the only grounds urged in the pleadings in this case for relief by injunction are, stated briefly, the facts that the defendant had natural gas which it was furnishing for heating purposes, and that plaintiff desired the gas for lighting purposes; that defendant had been restrained from furnishing gas for lighting, but that plaintiff was not a party to the proceeding, and that while defendant was forbidden to sell gas for lighting purposes, the city which passed the ordinance was not complaining. It might be sufficient to stop here and say that there is no ground stated for relief by injunction. No contract is averred, a violation of which is sought to be prevented—no suggestion of a contract, except the averment that plaintiff applied for a gas connection and got it. There is not even an averment that he made application for a gas connection for lighting purposes. Obviously, unless the defendant be shown to be exercising a public franchise in the vending of gas for lighting purposes, there is no more ground for injunction shown here than if he had sought one to restrain Peaslee, Gaulbert & Co. from refusing to vend oil to him. But the petition on its face shows that, as to the sale of gas for lighting purposes, the defendant was not only not exercising a public franchise, but was, by the ordinance which permitted it to do business in Louisville at all, expressly forbidden to sell gas for any other than heating purposes. The plaintiff is, therefore, in the position of asking an injunction requiring the defendant to violate an ordinance of the city.

Moreover, the injunction must at least be modified upon another ground. The parties whom the plaintiff attempts to represent, and in favor of all of whom the injunction was granted, have no "common or general interest." They have no joint right. They have only a question of law of common or general interest. But "it is not sufficient that the matters presented by the pleading raise a question of law of common or general interest; but if it were, defenses of varying character might be presented. * * * (Oswald *vs.* Morris, 92 Ky., 52.) See also Newman on Pleading, p. 465.

But there is higher ground upon which to base the decision of this motion.

This is a proceeding in the Chancery Division to enjoin proceedings on a judgment in the Law and Equity Division of the Circuit Court. Section 285 of the Code provides:

"An injunction to stay proceedings on a judgment shall not be

granted in an action brought by the party seeking the injunction in any other court than that in which the judgment was rendered."

This section has received full construction by the Court of Appeals. In C. and O. S. W. R. Co. *vs.* Reasor, 84 Ky., 369, it was held, in an opinion by Judge Lewis, that the Circuit Court has no jurisdiction to enjoin the sale of property under an execution issued upon a judgment rendered in the court of a Justice of the Peace. The opinion cites Kelley *vs.* Kelley, 2 Duvall, 263; Davis *vs.* Davis, 10 Bush., 274; Neeters *vs.* Clement, 12 Bush., 359, and McConnell *vs.* Rowe, opinion delivered October 9, 1886; and says:

"Nevertheless, the effect of the injunction would be to indirectly invalidate the judgment, and to some extent, impair its efficacy. But as the mode by which a judgment may be vacated, reversed or modified is elsewhere in the Code provided, the inhibition contained in Section 285 was manifestly intended, as it does in terms, to apply not to the judgment itself, but to proceedings thereon.

See also Jacobson *vs.* Wernert (19 R., 662).

This provision of the Code applies to third parties.

Said Judge Pryor, in Mallory *vs.* Dauber's executor, 83 Ky., 244:

"This is a comprehensive provision, and applies not only to the party against whom the judgment was rendered, but to all parties who seek to stay proceedings on the judgment * * *."

And in Stahl *vs.* Brown (84 Ky., 329) in a proceeding in the Circuit Court to enjoin the operation of a ferry established by the County Court, the Court of Appeals in an opinion by Judge Lewis, said:

"Moreover, being a judicial act" (the establishment of the ferry) "it cannot, according to the Civil Code, be vacated, nor the exercise of the privilege conferred by it be prevented or restrained by an order of injunction issued by another court in an independent and distinct action or proceeding."

And this was a suit by persons who were not parties to the proceeding to establish the ferry.

In this State we have the Code provision which goes further than the general rule, and prevents courts of superior jurisdiction from interfering by injunction with proceedings upon judgments of courts of inferior jurisdiction. But the general rule, independent of statute, is equally broad as to courts of concurrent or co-ordinate jurisdiction. In an admirable collation of the authorities upon this subject in 16 A. & E. Ency. of Law, 2d Ed., p. 398, it is said:

"No court has the power to interfere by injunction with the judgments or decrees of a court of concurrent or co-ordinate jurisdiction having equal power to grant the relief sought by injunction. The fact that the parties to the injunction proceeding are not the same as the parties to the judgment or decree which it is sought to enjoin does not relieve the case from the operation of the rule, nor can the consent of the parties change the rule or relax its binding force in any particular case; it is not established and enforced so much to protect the rights of parties as to protect the rights of courts of co-ordinate jurisdiction to avoid conflict of jurisdiction, confusion and delay in the administration of justice."

The rule as it exists, independent of statute, seems based, as said by Judge Taft, upon an enlightened comity of courts to prevent unseemly conflict of jurisdiction.

The injunction must be dissolved.

The other Judges of the Court of Appeals concur in this opinion, with the exception of Judge Paynter, and with the exception of Judge Guffy, who was not present at the hearing.

(Continued from Vol. LXXIII., Dec. 31, 1900, Page 1047.)

The Future of the Gas Profession.[1]—No. II.

Another point against the directorial board is that it is given to follow a stereotyped practice; and that, when a manager retires, his assistant is appointed to the vacancy in preference to a possibly more suitable man who may be found among the juniors on the staff, or elsewhere. I think that the cases where this practice proves to be a mistake are few and far between. For one thing, when one does not know the country, it is wise to keep to the beaten tracks. Two old proverbs—"Out of the frying pan into the fire" and "A bird in the hand is worth two in the bush"—are rightly held in esteem by business men. The mere fact of a man having been appointed to the post of assistant, is a strong recommendation in his favor. He would not have been selected for, or allowed to retain, this position if long past his prime or approaching a state of dotage, or suffering from bodily or mental deficiency. I do not urge the claims of the assistant for special consideration, from the fact that he has probably been faithfully serving the company for many years on a distinct understanding—none the less real because it has never been put down in legal black and white—that he should have fair treatment in regard to the higher post whenever a vacancy occurred. The directors have proof of his ability, as he has taken charge of affairs in the absence of the manager—perhaps for weeks or months at a time, in case of accident or illness—is respected by the employees and by the customers, and in a general way "knows the ropes" of the whole concern. He possesses special information that a novice, however clever, could not acquire in a year nor yet in two. Having regard to the capability of the directors for recognizing the particular kind of skill or ability they require, would it be wise to throw over the unique knowledge of their affairs, the special experience and mature judgment which in all probability they know to be centered in their assistant, in favor of youthful enterprise and energy as represented by a promising or plausible junior? It may be a mistake to pass over the opportunity of giving a clever youngster a chance to win his spurs or to acquire his experience at the expense of the company; but it is a greater mistake to throw away experience and ability that is waiting ready to hand.

The matter may be regarded from another point of view, and that is the effect of any action of this kind upon the younger portion of the staff, or upon the beginner who contemplates joining the profession. A permanency of employment, with a fair prospect of promotion, is always a great inducement to the young man and his friends. There is no lack of able candidates for the position of policeman, postman, railway porter, etc., even if a mere living wage is offered, because the prospect of permanency is considered, and this apart from the question of old age grants or other advantages. Young men of good parts will accept a junior post in a bank for a mere trifle to begin with, on account of the permanent position offered; and there are many who enter the gas profession and serve the best years of their life in a subordinate capacity, under the impression that they are working their way up, and that their diligence and perseverance will receive proper consideration when the time comes. In some other businesses it is said that the middle-aged man finds it desirable to dye his hair, to resort to other methods of keeping up a youthful appearance, and to conceal his real age; and such practices cannot be conducive to the real prosperity of the industry. It may be sound financial policy to turn the old horses out to grass the moment their pace or their wind fails; but no industry can be successfully run upon purely financial considerations. If it becomes known that the higher appointments are to be thrown open to the world at large, and the position and claims of those who have borne the burden and heat of the day are to be set aside in favor of some youthful prodigy from nobody knows where, and consequently that every year's service diminishes the prospect of promotion, the confidence of the young men of the first order, who as it is look askance at the gas profession, will not be increased.

But however this may be, the directors of a company are not sufficiently in touch with the daily operations and the labors of each member of the staff to be able to assess the ability of one as compared with another. Some men have a knack of pulling themselves together and putting on an abnormal quantity of steam when a director heaves in sight; and others, in scorn of such double-facedness, go to the other extreme, and scarcely do themselves justice. Granting that the second or third hand may be capable of making a better manager than the first assistant, the directors are not likely to know it. The principal who superintends the work will be clear on the point. But I venture to think that, whatever may be the case in other industries, the pushing young man has a fair field if no favor in the gas undertaking. Many who hold important positions as managers or secretaries to day began in a small way, and owe much of their success, especially at the first start, to the recognition of their capabilities and to the kindly encouragement of their predecessors in office. They have advanced from day laborer to retort house hand, to works foreman, and to the managership; or from office boy to rental clerk or collector, thence to chief clerk, and finally to secretary. Such men will usually speak with considerable feeling of the sympathy and encouragement received from their superior officers. And every head of a department having a dozen or more subordinates, finds opportunities of assisting and encouraging deserving young men, and a pleasure in doing so, apart from the fact that he is also serving the interests of his employers. It is all very well to talk of enterprise and energy, but no business of any magnitude would hold together for a year without the patient, plodding conscientious subordinate, who will not see the firm defrauded of a penny, and labors on contentedly from year to year, never rising to the surface, and receiving just enough remuneration to enable him to take up a position slightly above that of the laboring classes.

1. *Journal of Gas Lighting.*

One great defect in the gas profession, then, is the appointment of directors who have no special qualifications for the office. A second, and equally important one, is the absence of any recognized rule or custom as to where the director's authority ends and that of the manager begins. In this respect, every board is a law to itself; and the new accession to the board may be a strong believer in reform, and set himself to re-arrange the whole order of business, without knowing exactly what he is doing or being certain that his reform will be a real improvement. The duty of the directors is to engage a competent staff to carry on the business. Some boards attend a meeting once a month to hear and discuss reports from the manager, who is left to himself the rest of the time. Others go down, either as a whole or in committee, and examine the books once a week; they peep into the furnaces, and discuss technical details with the workmen; and they look up to the tops of the holders and down into the store wells. The manager must not buy a truck of coal, or discharge a workman, without their permission. The result is that the experienced gas manager, when looking for a berth, finds it a desirable precaution to know something about the views and customs of the directorate. One does not like to be invidious; but it is an open secret that there are boards of directors whom no man would care to take office under, while others are held in esteem.

One often hears at an Association meeting some such scraps of conversation as: "Where is —— now?" "Oh! didn't you know. He is appointed at —— in place of ——." Then comes a significant "Poor fellow," or a more cheerful "He will be all right there." It is a remarkable fact, and one pregnant with significance as regards the best interests of the industry, that a man is appointed to one place, and is condoled with; while he may be appointed to another, where the responsibilities and emoluments are as nearly as possible equal to the first, and be congratulated.

Some of your readers appear to look upon the gas managers themselves (either as individuals or as collectively represented by their Associations) as to a great extent responsible for all the deficiencies, not of the profession alone, but of the industry at large, and in duty bound to provide a panacea for every ill. Scarcely any important defect or grievance is discussed in your columns without at least one correspondent coming down like a thousand of bricks on "the representative Institutions," and telling the Gas Institute or the Institution of Gas Engineers, with more force than elegance, that they could improve matters if they chose. Writers in this vein appear to be rather in the clouds as to the real position, the finances and the scope of influence of these Associations. There is a tacit assumption that they are well-to do societies, representative of, and supported in an adequate degree by, the whole of the gas industry, and that their decisions are regarded as of equal importance by all parties—engineers, secretaries, shareholders and directors. We are accustomed to hear that the representative bodies ought to improve the status of the gas profession, to offer educational facilities, to appoint boards of examiners, and to formulate methods of procedure for directors and for consumers. Undoubtedly a full-fledged Association could do all this, and more. On the few occasions when the whole industry has gathered for a united effort, there has been no uncertainty as to its capabilities. We hear of a strong educational movement in gas circles in America; but I have yet to learn that the gas managers or their Associations there are called upon to bear the whole brunt and expense.

There is a tendency to forget that the bodies spoken of as the representative Associations of the gas industry, are to all intents and purposes Gas Managers' Associations, supported by the gas managers alone. I do not overlook the fact that a few companies—a trifling percentage of the whole—are far-seeing enough to assist in their financial support. But the attempt that was made some twenty years ago to establish a permanent Gas Institute that would adequately represent the whole of the interests concerned in the gas industry, failed entirely to secure sufficient support from the class upon whom it had the greatest claim—the financial interest, as represented by the directors of gas companies. Of the few who do subscribe, the greater part give a mere nominal sum—such as they might hand to a local goose club or a similar fund—rather than a contribution equivalent to the capabilities of an "Institute" in relation to the well being of the gas industry. One cannot help thinking that the nominal subscription is often given merely as a sort of compliment to the manager, or in good humored deference to his recommendation, rather than on account of a clear comprehension of the question and its connection with their own welfare. The boards who believe that the gas manager's place is at his desk, rather than at the Association meeting, have not yet ceased to exist. Others regard the annual gathering more as an excuse for bean feasting and junketing than as an opportunity for serious business; and this mistake is to some extent the fault of the public daily press, who invariably give more prominence to the *menu* card at the subscription dinner than to the readers of the papers, and to the details of the public hospitalities (if such are offered) rather than to the proceedings at the meetings. It is not necessary to labor this point further. The work of the Associations does not come before the immediate notice of the board, and need not be considered in connection with the dividend or the price of gas. Like the technical side of the gas manager's duties, it too often goes unfostered and altogether neglected simply from sheer ignorance.

If the gas managers in their corporate capacity decide, of their own free will, to take up the subject of educational facilities or any question relating to the welfare of the industry, no one is likely to raise any objection. But there is no obligation in the matter; and they could not be blamed if they followed the example of other bodies—such, for instance, as the commercial travellers—and applied the few guineas they have to spare exclusively to the benevolent fund. When privileged to dine with gentlemen of the road, I have often had the pleasure of subscribing to the pence box; but the company would probably stare if it was proposed that the contents of the pence box should be forwarded to a fund for benefitting the business of the firms they represent.

Yet there are some who seem to think that the gas manager is wanting in public spirit if he does not devote a portion of his (already in many cases inadequate) salary to purposes more intimately connected with his employer's interests than with his own. By greater facilities for education, I take it, is intended something like evening classes with nominal fees, on the lines of those that already exist in our principal towns, which practically enable any and every student to obtain necessary knowledge at an inconsiderable expense. The most successful gas engineers are those trained at a gas works; but evidently this kind of "facility" is not in view, for it cannot be said that the gas engineers of the country are suffering from a plethora of pupils, or that those who wish to enter articles are unable to find anyone to take them.

Free education may be a benefit to the financial interests and to the public generally; but gas engineers, when appealed to on the subject, are entitled to ask whether it will improve the status and emoluments of the profession. Improvements of this kind are the only things to attract a better class of workers into the profession. Has free reading, writing and arithmetic improved the position of the ordinary clerk, or the prospects of those desiring to attain to the dignities of quill driving and a seat at the desk? It has simply flooded the market to such an extent that a man who wants his ledgers posted can get it done at about half the rate of pay that he would have to offer if he desired to get a load of dirt wheeled away from his front door. The electrical engineering profession is popular, and has attracted a large number of students for whom full educational facilities have been forthcoming, with the result that a fully qualified electrical engineer, capable of managing an electric light works, can be secured at about the same remuneration as would be demanded by a retort house hand. The young man of ability and enterprise will not fail to mark this point, because, while ambitious to distinguish himself, he also looks to the securing of adequate remuneration for his pains.

After careful examination, I can come to no other conclusion than that, so far from a deficiency in technical skill and ability, there is on the staff of almost every gas undertaking an excess of energy and enterprise. Many of them may be slow and behind the times; but it is not the fault of the staff. Whoever heard of objections to generator furnaces, sloping retorts, slot meters, letting apparatus on hire, or other advancements coming from the salaried staff? I would like to see replies from a dozen or so of the younger members of the gas profession—men who were able to take advantage of modern educational advantages—to questions as to the exact extent of the benefit of their high class technical knowledge, how far it had assisted them in gaining their present positions, or whether it was a recognized factor in regard salary.

It often happens that energy and enterprise are regarded as dangerous qualities to be kept in check by the directorate, who have a keen eye to expenditure, and are apt to confuse outlay on extensions with current expenses for material and wages. If it was understood that the directors would recognize, and adequately reward zeal, energy and ability in the interests of the company, there would be no occasion to talk about increased educational facilities and bringing in a better class of men from outside; but it would soon be evident that the gas profession is comparable, in the matter of education and of ability, with any other.

[To be Continued.]

Report on Electric Lighting Exhibits at the Paris Exposition.

The following matter is contained in an advance copy of the official report, prepared by Mr. Carl Hering, in his station as United States Juror for Class 25 of the exhibits at the recent Paris Exposition, for the consideration of United States Commissioner General Peck:

General and Statistical.—Class 25 of the exhibits at the Paris Exposition, comprised "Electric Lighting," and included in the official classification: Arc lamps and their carbons; incandescent lamps; installations; central stations; application to search lights, navigation, war, and public works; safety and regulating devices; meters; photometry; apparatus for the distribution of light; fixtures and chandeliers.

The jury of this class consisted of 17 members; 8 of whom were French and 9 foreign; there were also four substitute members, 3 French and 1 foreign. All but one foreign member were present during most of the examinations and deliberations. The officers were Hippolyte Fontaine (France), President; Carl Hering (United States), Vice-President; Paul Janet (France), Reporter; Hippolyte Josse (France), Secretary.

The number of exhibits in this class, in the official catalogue in the order of quantity, was as follows: France, 103; United States, 82; Germany, 15; Great Britain, 13; Switzerland, 8; Spain, 8; Hungary, 5; Mexico, 4; Italy, 3; Austria, 3; Russia, 2; Belgium, 1; other countries together, 9; total, 256. These, however, do not represent the actual number of exhibits, as some arrived too late to be entered, while others that were entered were not exhibited, and some were transferred to other classes. When corrected, the numbers were about as follows: France, 98; United States, 37; Great Britain, 13; Germany, 11; Switzerland, 9; Italy, 6; Austria, 5; Hungary, 4; Russia, 2; other countries together, 15; total, 200.

The number of exhibits, however, should not be considered as representing the relative importance of the participation of the respective countries, as some of the single exhibits were quite small and others very large. A comparison of the number of awards based on the number of exhibits, with the intention of showing the relative importance of the different countries, is therefore quite incorrect and is manifestly unjust to those nations having the larger number of exhibits.

The numbers of awards in this class were as follows: Grand prize, 18; gold medal, 46; silver medal, 37; bronze medal, 18; honorable mention, 2; nothing, about 53; hors concours (not subject to award on account of representation, direct or indirect, on the Jury), 26.

Of these, the following were awarded to exhibitors from the United States: Grand prize, 0; gold medal, 8 (or 17.4 per cent.); silver medals, 8 (or 21.6 per cent.); bronze, 9 (or 50 per cent.); honorable mention, 0; nothing, 6 (or 11.3 per cent.); hors concours, 4 (or 15.4 per cent.).

Nernst Lamp.—The most prominent exhibit in this class, on account of its novelty and the great future claimed for it, was the Nernst lamp. Although the general principle of this new lamp had been announced several years ago, this was the first public exhibition of what was claimed to be the commercial form of the lamp. It was exhibited by the Allgemeine Elektricitäts Gesellschaft of Berlin, the owners of the patents, who had a pavilion lighted with about 300 of these lamps.

The lamp resembles in general appearance the ordinary incandescent electric lamp, except that the filament, instead of being carbon as usual, is made of magnesia together with the rare earths like zircon, thorium, etc. Such filaments must first be heated to about 700° C. before they become conductors of the current; this may be done with a match or alcohol torch, or in the "automatic" lamps by a fine platinum wire 0.03 to 0.04 mm. in diameter, wound around a thin cylinder of porcelain placed near the filament; the current first passes through this "preheater" connected in parallel to the filament, and as soon as the latter becomes conducting, the current passes through it and a very small electromagnet in the base in series with it, which then cuts the preheater out of circuit. The filament is very much shorter than in the usual incandescent lamp and somewhat thicker. Unlike the carbon filament, it is not attacked by the air, and the bulbs are therefore open, which avoids all the defects and failures of the usual lamps which are due to imperfect vacua.

It may be used indiscriminately with either the direct or the alternating current. The lamps as now made are for 220 volts and of 25, 50, 100 and over, candle power. A 25-candle power lamp takes 0.185 ampere, and a 50-candle power lamp 0.37 ampere, both at 220 volts. The economy is 1.5 watts per candle, which is about twice as good as that of the usual carbon incandescent lamps, therefore doubling the amount of light obtainable per horse power. The light is whiter than that from the incandescent electric, the arc or the Welsbach gas lamp. The life of the filament is about 300 hours if the voltage does not exceed the normal; it is less affected by the inconstancy of the voltage than the ordinary lamp. The perishable parts, that is, the filament and the preheater, are made so that they can be easly replaced by the user, and they cost only about one-quarter of the price of the lamp, so that the cost per hour is no more than for the ordinary lamps, although the original cost of the lamp is greater. The lamps were not yet for sale, but the probable price, it was thought, would be about 50 cents, and that of the replaceable perishable parts 12 cents.

This lamp is not intended by the makers to take the place of the present incandescent lamp, probably because it is difficult to make it for candle powers below 25 and voltages below 220. It is intended to take the place of the incandescent gas (Welsbach) lamp which is such a serious competitor of the present incandescent electric lamp; it is also intended to fill a want of some electric light between the usual incandescent lamp of 16 to 32 candle power, and the arc lamp of 300-1,000, and to take the place of the alternating current arc lamp, and those for small currents of several amperes. The Nernst lamp should therefore not be considered as a suceessor to the incandescent carbon lamp, at least not at present, but rather as filling an important field of its own between that and the large arc lamp. Its points of advantage are the higher economy, the higher voltage and the replaceability of the perishable parts; its disadvantage is the fact that it must be preheated before it will light.

A feature of special interest from a technical standpoint is the use of a fine iron wire 0.019 mm. in diameter, connected in series with the filament, and placed in the bottom of the lamp. The resistance of the filament diminishes rapidly as the temperature increases, and a slight rise or fall of the voltage would therefore greatly affect the candle power and the strain on the filament; the object of the iron wire is to overcome this. This wire is so proportioned that with about the normal current it is heated to that range of temperature 450 to 500° C., at which iron has a very rapidly rising temperature characteristic, that is, its resistance increases very rapidly with an increase of temperature produced by an increase of current. Being in series with the filament the total resistance, which determines the current taken by the lamp, will be the sum of that of the filament and that of the iron wire, and as the former decreases with increase of temperature while the latter increases, this sum may be kept practically constant. This ingenious device is one of the principal improvements to which the present success is due. The iron resistance absorbs about 10 per cent. of the voltage, but this is included in the above figure for the efficiency.

No lamps were for sale at the time of the Exhibition, and it was therefore not yet in commercial use; but shortly after the close of the Exhibition the makers announced their readiness to place it on the market.

Incandescent Lamps.—Before the Nernst lamps there was no important novelty or improvement shown in incandescent lamps other than the normal growth in the perfectioning of the lamps and in details.

The writer was told by the highest authority of the Allgemeine Elektricitäts Gesellschaft of Berlin that the 30,000 lamps made per day by that company contained no platinum. No further information could be obtained, nor could the nature of the substitute of the platinum wire be ascertained. The published descriptions of the products of that company contain no reference to it; but, on the contrary, stated that platinum is used where the wires pass through the glass. If this long looked for substitute for platinum has been found, and is actually in such extended use, it is an important improvement. The cost of the platinum in a lamp as made in this country is very small, notwithstanding that the price of the metal is about $180 per pound, but the daily output of lamps is so large that a saving in this item of cost would be worth striving for.

The Malignana thermo chemical method of exhausting the last trace of air from the bulbs, was shown in operation. It is used by a French company, which claims that the largest manufacturers in the world (which are in the United States and Germany) also use it, but the latter statement is only partially correct, as the process has been superseded to some extent in those factories by mechanical pumping. The Malignani process consists essentially in temporarily attaching to the bulb a small tube containing a chemical like red phosphorus, for instance, which upon heating and upon subjecting the filament to double its normal voltage, absorbs the remaining traces of gases in the bulb

after the mechanical exhaustion has been carried to about 1 mm. This chemical compound combines more especially with hydrogen and hydrocarbons, and the bulb is therefore filled with these before exhaustion. The vacuum is claimed to be perfect and the lamps therefore better.

The general practice in lamp making by the largest companies both here und abroad, seems to be to make the filament of a plastic solution of cellulose "squirted" through a hole into a thread which is then dried, carbonized and afterwards "treated" in hydrocarbons. The vacuum is produced mainly by mechanical pumps which have replaced the troublesome, expensive and slow mercury pumps. The Allgemeine Elektricitäts Gesellschaft of Berlin, which is no doubt the largest lamp manufacturer in Europe, makes 30,000 lamps per day at a selling price of about 12½ cents; 500 hands are employed in that factory. This is claimed by that company to be about half the total production in Europe, a statement which does not agree with those of other manufacturers. The daily production in Europe is probably greater than 60,000 lamps per day. One of the largest companies in France makes 12,000 per day; the total daily production in France is said to be about 32,000 per day, the lowest selling price being about 10 cents, but the average probably appreciably greater. The largest American company claims an output of 57,000 per day and that this is about half of the total daily production in the United States. Fifteen hundred men are employed and the average selling price is 17 cents. According to these figures the total production in the United States is somewhat less than double that in the whole of Europe; a safer estimate would be that the former is about 50 per cent. greater than the latter.

The important direction of improvement started some years ago in making lamps of double the usual voltage, and therefore nearly half the current, is making progress, apparently more so abroad than here. It has been claimed that this is due to the consumers there being satisfied with a poorer qaality of lamp than here; whether the latter is the case or not could not be determined by the writer; he noticed, however, that the lamps in the same room and even on the same chandelier were often of widely different brightness, indicating less care and less attention to economy than is exercised in this country.

Another indication that the American lamps are better, is that England buys many of them in spite of the competition of the much cheaper German lamp.

The large German company makes high voltage lamps of 200 to 230 volts, and from 10 to 50 candle power. The life of these at 3.6 watts per candle is claimed to be nearly the same as of those of half that voltage and 3.1 watts per candle. The economy is given as from 3.6 for 16-candle power to 3.0 for 50-candle power lamps at 230 volts and from 3.1 to 3.0 at 200 volts.

Very little impartial data could be obtained about lamps at the Exhibition and a certain amount of secrecy is guarded in their manufacture; it is, therefore, not possible to deduce very definite and reliable conclusions. This is all the more the case as the standard candles seem to be different here and abroad; the Hefner amylacetate lamp is the generally adopted standard abroad, while here the standard seems to be an undefined one handed down from previous years, and somewhat higher than the Hefner unit; a comparison of economies therefore appears to be less favorable to American lamps than it really is. Lamps are made by the largest manufacturers in this country up to 250 volts. Those of 200 volts, which are more satisfactory, are said to have an economy of 3.8 watts and are claimed to run about 750 hours before their loss of candle power exceeds 20 per cent.

Considerable stress is now being laid abroad, on the advantages of forcing lamps at the expense of their life. The accompanying decrease in the total cost of the light, including both lamps and power, was pointed out by others besides the writer[1] nearly 8 years ago, and is now being more generally recognized; a number of manufacturers are urging their customers to use the higher efficiency but shorter lived lamps. This is all the more important abroad where lamps are cheaper than here. The large German company claims a life of about 1,000 hours for an economy of 3.1 watts per candle and about 300 hours for 2.6 watts. A large French company claims 1,000 hours for 4.5 watt and 200 hours for 2.5 watt lamps.

A French exhibitor showed a system of using low volt lamps of about 20 volts, five in series on a 100-volt circuit, but each connected to corresponding points of the winding of a small, cheap, single coil transformer or compensator, in parallel with the series of lamps, and placed near them, thus enabling one or more lamps to be out without affecting the others. An economy of 50 per cent. was claimed on account of the higher efficiency of forced, low volt lamps. This system would be of very limited application even if the claims were borne out when all of the costs and inconveniences are considered.

A French exhibitor winds a few turns of tinned wire in a groove near the base of the bulb, which enables the brass lamp base to be soldered on to the lamp.

The German companies are about to unite on a uniform standard lamp base and socket of the Edison screw type. It would be very desirable to not only do the same in this country, but to join with the other leading countries in adopting a standard international lamp base.

A French company exhibited a non-interchangeable lamp base of some interest, to prevent any but a lamp of a certain candle power from being put into a given socket. It is of use more especially when consumers pay for the current by the number of lamps installed, instead of by meter. The contrivance consists of a bayonet jointed base with 3 instead of 2 dowel pins; these are spaced differently around the base for lamps of different candle powers.

Incandescent gas lamps known here as Welsbach lights, are becoming a serious competitor of the incandescent electric light. They are usually of much greater candle power than the customary incandescent electric lamps, and ought therefore not to be compared directly with them. It is intended to meet this competition with the Nernst lamp which is to be of greater candle power than the usual carbon incandescent electric lamp, and is much more efficient; it can also be used at higher voltages, thus reducing the cost of the conductors.

Arc Lamps.—The only notable novelty in arc lamps which may have an important future is the Bremer lamp. In this the carbons are mixed with 20 to 50 per cent. of non-conducting metallic salts, like those containing calcium, silicon and magnesium, which, according to impartial and trustworthy measurements by Wedding[1] results in an economy as high as about 0.1 watt per mean hemispherical candle, which this authority claims is about three times as good as in the usual arc lamp. This is for continuous current; for alternating currents the efficiency was not as good. The consumption of carbon is about twice as great, but the specific consumption is no greater than before.

The light is of a much more reddish and yellowish color than the bluish arc light, and is about 100 per cent. more penetrating through misty air than the light from the usual arc, for which reason it is better adapted for search lights and lighthouses. The white oxides formed are deposited on a shallow cone placed over the arc and form a very a very good reflector. The carbons are both at an angle as in the letter V with the arc at the lower ends. They are fed by their own weight, thus obviating the necessity of any mechanism except for starting the arc. The arc is 4 to 5 cm. long, which is very much longer than usual. If there are no attending disadvantages that more than counterbalance these advantages, there would seem to be a great future for this lamp.

There was a very large number of arc lamps exhibited, especially in the French section. In general the light from them is whiter and far more steady than is usual in this country, and the American lamps are not well thought of there for that reason. The difference seems to be due to the general type of regulating mechanism used here, which drops the upper carbon suddenly, while in France the upper carbon is allowed to descend only very gradually by means of a brake actuated by the regulating magnet, and acting on the periphery of a wheel driven by the weight of the carbon and its holder, at a much greater peripheral speed than the descending carbon. There are also other types of mechanism including the plain solenoid, but in general they all feed the carbons very gradually and regularly.

Arc lamps are almost always connected to constant potential circuits, at least on the Continent, and our more usual series system, which is scarcely known there, does not meet with favor, owing no doubt chiefly to the unsteadiness of the lights and the higher voltages of the circuits. With the exception of improvements in details in the foreign lamps, and the introduction in this country of the inclosed arc and some constant potential lamps, the status of the arc lamp is about the same as it was when the writer made a similar report to the United States Commissioner General to the Universal Exposition of 1889 in Paris[2].

1. Trans. Amer. Inst., Elec. Eng., Vol. X, p. 65.

1. *Elektrotechnische Zeitschrift*, July 5, 1900, p. 546.
2. See that report, Vol. V. p. 52.

In general the constant potential arc lamps are connected two in series together with a dead resistance, across the 110-volt mains. An improvement of importance shown in the French Section enabled three lamps to be connected in series without a dead resistance. This gives improved economy, In general it consists in using differential lamps; that is, those in which the regulation depends on both the current and the voltage. Many of the exhibitors also had alternating current lamps, the mechanism of which was in general similar to those for continuous current, except that the iron cores have to be laminated. Some small, steadily burning lamps in the French section, with as small a current as 2 amperes, were also of interest, as they are rarely found in this country, notwithstanding their greatly increased economy over the incandescent lamp.

All the exhibits of the inclosed arc lamp were from this country, directly or indirectly. Notwithstanding the great progress made by this type of lamp in this country, it is not favorably received on the Continent, especially not in France, where it is objected to as being too unsteady and too blue in color, the French being accustomed to steadily burning, white arc lights. The chief advantages of these lamps, namely, the saving in attendance and carbons, are not considered there to balance their disadvantages.

The arc light carbons used in France are more generally cored and are, as a rule, of better quality than in this country. American carbons are not well thought of in France. The finer grade of carbons used there contribute to the greater steadiness and more even burning of the lamps found there.

Electroliers.—The exhibits of chandeliers for electric lights were almost entirely French and were, as a rule, very tasteful and beautiful, both in design and in workmanship. They were, however, often very badly adapted for concealed wiring, and their appearance was therefore often greatly marred by unsightly external wiring, which would not be tolerated in this country. Insulated pipe couplings for the tops of combination gas and electric chandeliers, so much used here, seem to be scarcely known there. Some of the decorative effects on chandeliers, made of inflammable materials close to incandescent lamps, although very beautiful, would not be allowed in this country on account of danger of fire.

A feature of interest to Americans in connection with the holophane globe exhibited in the United States Section is that, although the invention was French, and was the result of a vast amount of labor in making the calculations, the globes could not be made in France on account of the practical difficulties involved in their construction. It was not until an American company undertook the manufacture of them that this ingenious invention could be put on the market.

Accessories, Switches, Etc.—Among the smaller accessories to electric lighting, except fuses, there seems to be little of special interest to Americans, as they appear to have been developed to a higher degree of perfection here than abroad, both in design and execution; many of those exhibited would not be permitted by the underwriters in this country. In general, the rules concerning safety against fire are not as strict as here, judging from some of the exhibits and some of the apparatus one finds installed there. There would appear to be a good market for American goods of this class abroad.

Regulating resistances, theater dimmers, motor starting resistances and resistances of a like kind, seem also to be better developed here than abroad.

One of the large German companies uses fuses of silver in place of lead alloy, the reason being that for the same fusing current the amount of metal volatilized is least; the melting temperature is also lower than copper and they are more constant and reliable.

An interesting system of non-interchangeable fuses was also shown in the German Section, the object being to prevent a larger fuse from being substituted for a smaller one. The fuses are in porcelain plugs which screw into sockets to various depths, according to the capacity of the fuse. A plug containing a fuse which is too large could not be screwed in far enough to make both contacts. The system seems to be worked out well and could be introduced here to advantage.

Search-Lights.—There were some very fine exhibits of search lights and lighthouse lights in both the French and the German Sections, but their description does not properly belong to this report. In general, the parabolic reflector seems to have superseded the Mangin, or reflecting lens type. The Schuckert Company grinds them by means of a machine which makes them perfect parabolas both inside and outside, and they utilize more of the light of the arc than the others, besides dispersing it to a less degree. The general practice is to make them of glass, but some made of metal were also shown, the advantages of which, in war, are evident. The largest projector was 1.5 meters in diameter, and was exhibited by the Schuckert Company, who first introduced these parabolic reflectors; the very large one at the World's Fair at Chicago was made by that Company. Some of the search lights exhibited were directed vertically and horizontally by electric motors, thus enabling them to be operated from a distance.

Meters.—While there were many exhibits of electric meters, it seems that the Thomson meter (American) is used most largely in Europe, except perhaps in Germany. The French Company which manufactures it makes about 300 per day, which is a good indication of its popularity abroad. The modifications in it are in detail only. The same French Company also makes the O'Keenan meter, which is a small, sensitive, cheap, continuous current ampere hour meter for small consumers; 11,000 of them are already in use. In principle it is like a d'Arsonval galvanometer or Weston measuring instrument, except that the coil can revolve on points, being provided with a 4 or 6 part commutator and being wound in the form of a cylindrical cap covering the fixed core held between the poles of the permanent magnet. It is connected as a shunt to a fixed resistance in the main circuit, and the number of revolutions is registered. Its characteristic is almost exactly a straight line. Some idea of its sensitiveness is obtained from the fact that a 5 ampere meter starts with 0.03 ampere, or less than 1 per cent. The current in the coil is then only 0 00025 ampere and the voltage only 0 0025, the power in it is therefore less than 1 microwatt, and the torque is said to be then about the same as in the Thomson meter with 3.5 watts, which is over three million times as great. It is not yet practicable for large outputs. There would be a good field for such a meter in this country.

An interesting modification of the Thomson form of meter was shown in the German Section. The armature, instead of being of the gramme type as usual, is wound like that of the original Thomson-Houston arc light machine, with three coils, two of which are always in series. The result is that the current passes through two of the coils in series instead of in parallel, as in the gramme winding, and as the minimum diameter of the wire is limited by practical considerations, it is more thoroughly utilized by this series arrangement, or, in other words, the weight of wire required for a certain torque is very much less. This makes the armature much lighter in weight, with many important attending advantages. The commutator friction is also greatly reduced by this change. An impartial test showed that it had many excellent qualities.

The well known Aron double pendulum meter was well exhibited and in numerous forms, one of which was for 3-phase currents. It is used in Germany. Although well constructed and probably accurate, it is not likely that it would find much favor in this country.

Fuel Value of California Oil.

Mr. W. L. Watts, at the instigation of the California State Mining Bureau, has been experimenting on the fuel values of California oils. Some of the latest results of his researches as shown in Bulletin No. 19 prove that the ultimate analyses of samples of oil from California and the Eastern States compare as follows:

Locality Where Oil Was Obtained.	Specific Gravity.	Nearest Degree.	C.	H	O.	N.	S.
Oil Creek, Pa.	0.730	62° B.	82.0	14.8	3.2	.....	...
W. Virginia..	0.840	36° B.	84.3	14.1	1.6	.....	...
California....	.....	.....	86.934	11.817	...	1.1095	...
California....	0.920	22° B.	84.0	12.7	1.2	1.7	0.4

An examination of the foregoing table shows that in the California oils the content of carbon as compared to that of hydrogen is greater than it is in oils from Eastern States. Dr. Salathe says: "The refining of the crude California oils is not an easy task, and they require refining methods different from those practiced with Eastern or Russian oils. The complicated nature of this class of asphaltic crude oils necessitates complete elimination of all unstable hydrocarbons by inexpensive practical processes. Another great difference exists between specific gravities of Eastern oil distillates and those of California oils. Viscosity of distillate or reduced stock being equal, the gravities are from 5° to 6° B. lower in California oil fractions than in those of Eastern oils. Flash and fire tests are from 10° to 30° F. lower in California oil distillates than in Eastern distillates of the same gravity."

The average yield of products from 100 barrels of Ventura county, California, mixed crude oils of 20° B., determined by actual running on a large scale, is as follows:

	Bbls.
Gasoline, 76° B.	3
Benzine, 63° B.	4
Kerosene, 45° B.	15
Heavy kerosene, 38° to 40° B.	8
Gas distillate, 28° B.	21
Light lubricating (spindle) oil, 26° B.	10
Neutral oil, 23° B.	12
Heavy neutral oil, 21° B.	6
Reduced stock, lubricating oil, 14° B.	5
Asphalt, crude.	11
Loss.	5

The bulletin continues: "The extraction of pyridine bases with dilute sulphuric acid should be done before the redistillation of the distillates, as the treatment of those distillates with concentrated sulphuric acid will otherwise form certain sulpho-conjugated products, which, during the washing process with water and alkali, decompose and re-enter into solution with the refined products."

"The petroleum of the Eastern States is composed principally of hydrocarbons of the paraffine series. As previously mentioned, by far the greater portion of the California oil is used for fuel, and that in a crude state. It is the general opinion of those who use oil as fuel that, weight for weight, there is not much difference between the fuel value of oils of different specific gravities, provided the oils are clean, or a suitable allowance is made for water and other foreign substances which they contain. A portion of the oil is used for fluxing asphaltum and for the manufacture of illuminating gas, and a portion is refined. The portion refined yields crude naphtha, illuminating oil, gas distillate, lubricating oil and asphaltum. The naphtha distilled from California oils is of special value for use in gasoline engines. Those who have made comparative tests of California and Eastern gasoline in gasoline engines claim a superiority for the California product.

"As might be expected from the foregoing statements concerning the relative composition of petroleum from the Eastern States and the asphaltic oil of California, illuminating oil manufactured in this State contains more carbon and less hydrogen than does illuminating oil manufactured from Eastern petroleums. The result is that, when burned under similar conditions, California oil gives a more smoky flame than does oil manufactured from Eastern petroleum. This is due to the fact that it requires more oxygen to effect the complete combustion of carbon than it does to consume hydrogen.

"There is no doubt that, as time goes on, more use will be made of the constituents of our asphaltic oils in chemical manufacture."

Fuel Values of California Petroleum Compared With Fuel Value of Coal.

	Available Heat Units in One Kilogramme.	Available Heat Units in One Ton, Calculated as 909 Kilogrammes.	One Ton of 2,000 pounds Nanaimo Coal and Equivalent in Barrels of Petroleum.
Nanaimo coal.	6,684	6,075,756	.....
Sample of petroleum 15° B., from practical working test in locomotives in Southern California Railroad.	.....	9,886,585	3.870
Sample of crude petroleum, 16.5° B.	9,800	8,908,200	3.487
Sample of lubricating oil, 16° B. to 17° B.	10,788	9,796,192	3.834
Samples of Los Angeles oil, 13° B.	10,203	9,274,527	3.630
Maximum fuel value obtained in calorimetric tests.	10,381	9,436,329	3.693
Minimum fuel value obtained in calorimetric tests.	9,991	9,081,819	3.554
Sample of Summerland oil (crude).	9,688	8,806,392	3.447
Samples of Summerland oil extracted by naphtha.	10,242	9,304,978	3.649

The relative fuel value of coal and Los Angeles oil, as shown by combustion in furnaces, is given as follows: The heating furnaces of Los Angeles Steel and Iron Company: One ton Wellington coal equals 2.50 barrels of oil; for steam purposes, one ton of Wellington coal equals three barrels of oil. Los Angeles Consolidated Electric Railroad Company: Steam purposes, one ton of Wellington coal equals 3.62 barrels of oil. Los Angeles Courthouse: Steam purposes, one ton of good coal equals 3.10 barrels of oil. Southern California Railroad Company: Steam purposes, one ton of Nanaimo coal equals four barrels of oil.

Chances for Plumbers in the Philippines.

By G. D. R., in *Metal Worker.*

I visited a number of the so-called plumbers' shops in Manila, Iloilo and other large cities of the Philippines and was surprised to find work done in so crude a manner. In nearly all of the shops the workmen were Spanish or natives, and they have but very few tools. For one or more hundred years there has been little inducement for the pipe fitters of the Philippines to put in any sort of equipment of tools or appliances for working among the pipes and fittings, for the reason that there has been an absence of these articles in the islands.

The plumbing of the houses and public buildings has been woefully neglected. Everywhere I noticed that the sewerage was permitted to run over the open ground. In most places the earth was so fully saturated with the waste liquids from the houses that the foul matter remained exposed, dealing out disease and death continually. The pipe fittings I saw were all in bad shape, and the work very poorly planned and set up.

There is an excellent chance for pipe fitters in the Philippines, because of the new order of things compelling the owners of houses and manufacturing establishments to put in systems of drainage and pipes for carrying liquids on the same plans as in America. It will be a number of years before the shops of the Philippines can be put into service for doing any good work among pipes and pipe furnishings.

In one place where the writer called the only form of wrench the native pipe fitters had was of the sort shown in Fig. 1, and this style of wrench is employed by the majority of the native pipe fitters. The jaws are forged from iron and provided with a check or toother piece, *B*, which is pivoted at the lower jaw at *C*, and fits into a notch in the upper jaw. The nut *A* is taken hold of, and the piece *B* set in place and hooked, and this serves to support the ends of the jaw and prevent them springing under pressure of the nut. This crude sort of tool is really fit for the junk pile, as it slips and springs out of shape at light pressure.

I saw some very singular samples of native plumbing in a number of instances, and Fig. 2 is an illustration. The valve was patched with a piece of sheet metal, which was pinned on as at *D*, and this leaked. Then there was a wood plug driven in at *E*, from the sides of which water trickled. At *F* they had a piece of tin riveted on over a portion of the pipe which had split, and as the riveting was poorly executed, they wound hemp cord over the whole thing as shown.

In Fig. 3 is another specimen. I saw this piece of work in a new hotel, which had been erected in Manila. The parts of the valve and the pipe and connections were all new, and had the appearance of having come from America. But the good parts were quickly put out of condition by the rough plumbers of the Philippines. First they gave the stem of the valve a blow and bent it as at *H*, and they left it in that form, not thinking it worth the while to straighten it. Then they in some way worked the wheel loose from its position on the stem, and the round steel pin which served as a key was lost. Instead of taking the time and trouble to replace it with a new pin they drove in the first piece of metal which came to hand. Then the check valve was patched with a piece of hempen material as at *I*. There was no necessity for this, for as soon as the hemp was removed the place that formerly leaked tightened and no further trouble was experienced. Another odd feature I noticed in this piece of work was a little brass pipe joined into the main pipe as at *J*. This, it seems, was an air vent; but, of course, is improperly set in position, and there was trouble experienced with the pipe taking in air when the water was shut off.

The Filipinos are very reckless with their tools. I recollect seeing some of them at work on a piece of pipe which they were putting up, as shown in Fig. 4. There were four natives engaged at the work, and each was boss. They all had a chance at the job, and the amount of tinkering and patching amused me. The first thing the natives did was to break the pipe at the threads at *K*, for they tried to bend it around a form, their idea being to get a turn in the pipe and joints. After an hour's work they repaired this break, and proceeded to break the pipe at *L* while trying to accomplish the same results. Finally they listened to suggestions, and bent the section of pipe at *L*, by first filling it with rosin and bending it over a form made for the purpose. The parts were then put together.

The average Filipino pipe fitter works for about 20 cents per day, with the result that his labors are not valued highly as compared with the price of American workmen. Consequently we often see plumbers in these islands devoting an entire day to a small, cheap job, which in America, with American tools, could be finished in a few minutes. For example, the average native pipe fitter is without the proper equipment

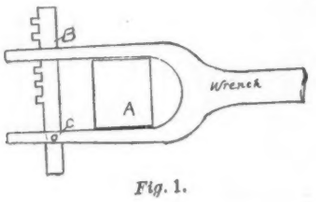


Fig. 1.

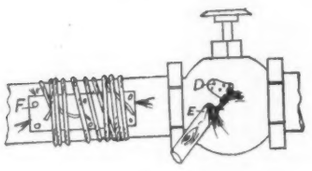


Fig. 2.

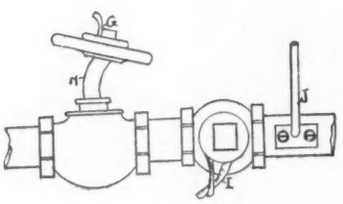


Fig. 3.

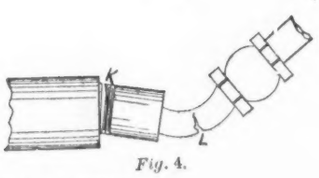


Fig. 4.

Figs. 1-4.—Filipino Tools

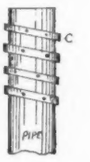


Fig. 5.

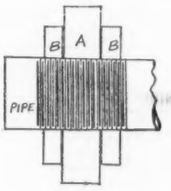


Fig. 6.

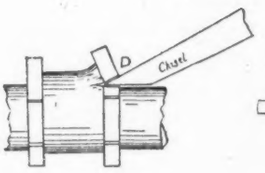


Fig. 7.

Fig. 8.

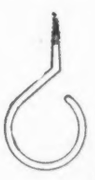


Fig. 9.

Fig. 10.

Fig. 11.

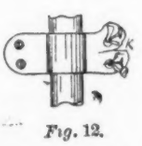


Fig. 12.

Figs. 5-12.—The Makeshifts of Incompetency.

of taps and dies, and his thread cutting on pipes must be done by other means. It seems strange to see natives wrenching laboriously for hours and even days trying to shape threads on ends of pipes, when in America there are tools available with which the threads could be cut in a very little while. I saw some of the natives forming threads like a worm, winding a previously shaped piece of metal around the pipe and riveting it in place, as at *C*, Fig. 5. This made a curious piece of work, and represented considerable labor, but it was not effective, as the joint leaked at the threads. The native plumber has peculiar ideas concerning the adjusting of nuts on pipes. I have seen a series of flanges employed in places where one would have answered the purpose. In Fig. 6, for illustration, a section of a combination of this sort is shown. The central threaded flange *A* is braced on either side by the additional flanges *B*, *B*, both of which are cut with threads and screwed up tight to the middle one.

For some reason, the native plumber is destructive in his habits. I stepped into one shop just as a native drove a chisel through a brass union, as at *D*, Fig. 7. It seems that the threads were clogged and the pipe could not be turned out readily, and he took this means to remove the joint. The native plumbers are reckless with their hammers and chisels, and many fine pieces of mechanical work have been destroyed by them. I have seen pumps so thoroughly put out of service by the shiftless manner in which the local pipe fitters work that an American workman would have to work a day or more to get them back into proper working order. I have been present at the tearing to pieces of the pipes of ice-making machines by native pipe fitters, and when the latter got through with what they had to do the equipment was ready for the junk pile. The natives lack the proper amount of mechanical ability to judge of the true fault of a defective machine. If a pump rattles or groans, they will usually go to work at some remote portion and tear it to pieces, while the real source of the trouble is overlooked. Ice making machines suffer in the same way. The trouble may be in the engine, and the natives will work at the tanks, and so on.

The usual mode of keying parts of apparatus to shafts in pumps and other apparatus in the Philippines is like that sample shown in Fig. 8. Instead of using the regulation square key and cutting a key seat, the native files a part of the shaft flat and then drives in a key of the shape shown at *E*. The key is made on the beveled plan, and as it is driven in deeper it tightens and serves its purpose for a time, but it cannot be depended upon, and most of the American workmen who have had to overhaul the bad work of the natives have removed this form of key and substituted the right kind.

Native plumbers have strange ideas concerning the strength of metals, and I have seen them depend upon slender hooks like that in Fig. 9 to support really heavy and important pipes. The result is that the weight of the pipes draws down the hook and spreads it open in a short while, and then the American pipe fitter has to follow behind and replace these defective hooks with the properly formed eyes or larger and stronger hooks.

I saw in one large building which the native pipe fitters furnished in Iloilo recently that they used wood brackets for stringing much of the piping. These brackets were hard wood, but instead of boring the holes for the screws and nails with which to attach the same to the wood work, they were driven in, so that there was splitting and breaking of the wood at several places in each bracket, as at *F* and *G*, Fig. 10. In every place where these wood brackets were used the same sort of poor workmanship was noticed. Again, it was observed that much of the pipe work was in poor order. For example, Fig. 11 shows the way in which some of the work was abused. Instead of properly fitting a screw, as at *J*, screws, nails and pieces of metal were usually driven in as at *H* and *I*. I saw much work of this description in the new buildings which have been lately fitted throughout with pipes and modern conveniences. Many of the pipes were nailed to walls by means of pieces of sheet metal laid over and tacked as at *K*, Fig. 12.

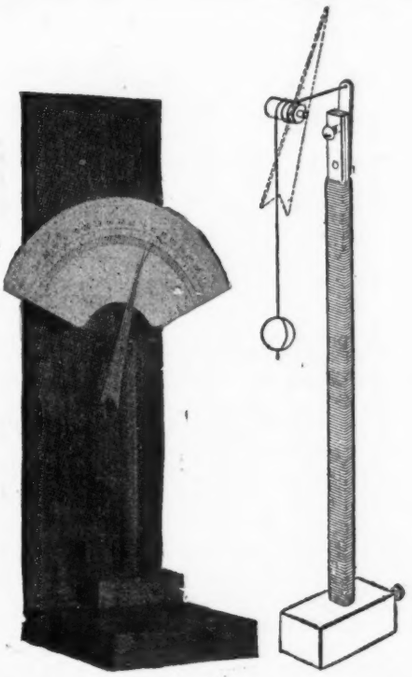
A Metallic Thermometer.

By Mr. George M. Hopkins.

A mercurial thermometer calls for manipulations which are not within the scope of the amateur, but require the skill and experience of the regular manufacturer. A metallic thermometer, however, is very easily made, and serves the purpose fully as well as a mercurial thermometer. It can be made as sensitive to the variations of temperature as may be desired.

It is made by placing together a strip of steel and one of brass 6 inches long, ¼ inch wide and $\frac{1}{32}$ inch thick. The ends of the strips are tinned for about ⅛ of an inch at each end on their adjacent faces, and then put together and heated first at one end and then at the other, so as to solder them together at the ends.

The brass strip is made about ¼ inch longer than the steel strip, and is



bent over and perforated to receive a silk thread as will be presently explained. Commonly, when strips of steel and brass are used in a compound bar, they are riveted at short intervals, to keep them from buckling. In the present case the compound bar is provided with a winding of soft wire (No. 30) which keeps the strips close together. To insure permanency the bars are drilled and riveted with a single rivet at each end.

The compound bar thus made is inserted in a round hole in the middle of a hardwood block 2½ inches long, and held there by an ordinary wood screw inserted in the end of the block and clamping at the end of the bar. The wooden block is secured to a base piece, 4 inches square and ⅞ inch thick, having attached to it a back board ¼ inch thick, 4 inches wide, and about 10 inches high. A wire nail about $\frac{1}{16}$ inch in diameter and 1½ inches long is driven through the back with its pointed end projecting about 1¼ inches. The nail is about ¾ inch from the upper free end of the compound bar. A paper roll is formed upon another nail or a piece of wire a trifle larger than the one used in the construc tion of the thermometer. The strip of writing paper used for this roller should be 1 inch wide and about 8 inches long. Enough of the paper is wound to make the roller ¼ inch in diameter. The paper, except the first layer, is pasted as it is rolled, so that it forms a solid paper roll when it is dry.

The roll, when dry, is transferred to the nail projecting from the back piece, and a pointer, or index, about 2½ inches long, is cut from thick writing paper and glued to the end of the roll. Then a silk thread is tied in the eye in the free end of the compound bar, and passed over the roller on the nail, and wound three times around the roll, and it has attached to it a small weight. In the present case this weight consists of a lead bullet split half open with a knife, and closed down upon the thread by pliers or by hammering. With every change in temperature the compound bar swings, so as to cause a movement of the index by the pulling or releasing of the thread and the raising or lowering of the weight.

The index should be placed in a vertical position when the temperature is about 70°; then the winding of the silk should be separated a little, and a small drop of mucilage should be placed on the middle convolution of the thread at the top of the roller, so as to cement it to the roller and prevent any change of adjustment.

A semicircular piece of bristol board, about 6 inches in diameter, is temporarily supported behind the index by a block glued to the back piece. The bristol board is to form the thermometer scale and is fastened to the block by tacks or otherwise, so that it can be removed and accurately replaced. A pencil mark is now made on the scale at the point of the index which indicates the temperature as shown by a mercurial thermometer at the time. If it is 70°, the mark on the new scale represents this temperature, and whenever the index points to this mark the observer knows the thermometer is 70°.

Now the thermometer is placed in a refrigerator along with a mercurial thermometer. They are left in the refrigerator for an hour, and then a pencil mark is made at the point of the index. This will, perhaps, be 40°. The space between these two marks is divided into 30 even spaces, representing as many degrees, or it may be divided into 15 spaces, each of which will represent 2°. This graduated space serves as a guide for constructing the balance of the scale. If 2° spaces are used, 20 such spaces laid off on the left hand side of the scale will extend the scale to zero. Twenty more such spaces will extend the scale to 40° below zero, which is lower than any temperature experienced in this climate. The space between 40° and 70° is already graduated, and the space above the 70° mark is graduated as described for the lower end of the scale. As each line represents 2°, 10° would be represented by 5 lines, so that the 5th line could be extended beyond the other lines for the sake of convenience in reading. Figures from 0° are placed opposite the long lines so as to read 10°, 20°, 30°, 40°, and so on, as in an ordinary thermometer scale.

The amateur can refine this thermometer as much as he pleases. He may, if he desires, place the entire device in a case and cover the dial with a glass, provided he furnishes several apertures to enable the air to circulate and thus keep the temperature the same as that of the external air. The free end of the compound bar may have a spring riveted to it, as shown in the detached view, and an adjusting screw may be inserted in the compound bar so as to bear against the spring. With this construction, the silk thread may be tied in a hole in the free end of the spring, and the desired adjustment may be made by turning the screw one way or the other.

By making the compound bar longer, or diminishing the diameter of the cylinder around which the thread extends, or both, the sensitiveness of the instrument may be greatly increased.

Remuneration to Cities for Franchise Rights.

[A paper read by MR. BIRD S. COLER, before the League of American Municipalities.]

The topic which I find myself called on to discuss is: What remuneration, if any, should be exacted from light, water, street railway, telephone and subway corporations, and how should it be collected?

This title naturally excludes from discussion all questions relating to municipal operation of franchises; it presupposes that such franchises are to be privately operated and contemplates consideration only of the terms upon which the grants should be made.

What is rather loosely termed "municipal ownership" is now, so far as it relates to franchises involving the use of city streets, scarcely to be regarded as debatable ground. On the subject of municipal operation, however, there is much to be said for and against, and I am glad, therefore, to have to deal, within the limits of this short paper, with the simpler problem.

I take it for granted that no one will now dispute the proposition that the public should receive remuneration, in one way or another, for the use of its streets by private corporations. The only question is: How can that remuneration be most justly exacted and most successfully collected?

The city of New York has for over two hundred years been dealing with this problem with greater or less success—generally with less. It began leasing its ferry franchises in 1674, and twelve years later its right to control such privileges was confirmed by the famous Dongan charter.

The granting of franchises for street surface railroads in New York belongs to the history of the last fifty years. During the first half of this period these grants were made directly by the State Legislature, generally without any provision for compensation and always without adequate provision. Unfortunately the most valuable of these franchises were thus disposed of during that time.

The constitutional amendment of 1874 called for the action of the local municipal authorities, and in 1884 a general law of the State provided for the sale of all such franchises at public auction to the highest bidder, and prescribed a minimum, or upset price, of 3 per cent. of the gross receipts during the first five years of operation and 5 per cent. thereafter.

Compensation for sub-surface rights, such as those enjoyed by telephone, telegraph, gas, electric light and power, steam heating, refrigerating and other subway corporations, has received scarcely any intelligent consideration. In fact the great value of some of the franchises in a great metropolis like New York has only during the last few years attracted any popular attention whatever.

In my judgment the most important point to emphasize in regard to this subject is that, no matter what the method of exacting compensa-

tion may be, it is practically impossible for municipal authorities to make any bargain with a private company which will not appear inadequate to the next succeeding generation. When the most valuable surface railway franchises in New Yoak were being disposed of, there might have existed some extraordinarily far sighted man who could have foreseen the immense growth of the city and prophesied what their value would be in the future. But if such a man had been in a position of sufficient authority to demand what he deemed to be an adequate compensation, the promoters of the railway enterprises would have stood aghast at his figures. The railroads would simply never have been built. And if the railroads had not been built the growth of the city would have been stunted and the prophet would have stood discredited. Here lies the problem then. On the one hand not to discourage enterprising capital and on the other hand to place some limit on its profits. Now, if the city makes a poor bargain, but that bargain has only, say, twenty-five years to run, there is no great harm done; for twenty-five years is as nothing in the life of a great city. But if a franchise be granted in perpetuity of for a very long period—like that of the New York and Harlem Company, which runs until the year 2,389—no matter how advantageous the bargain may seem today it is likely to appear quite ridiculous an hundred years from now.

Short terms for franchises are, therefore, the most important thing. If that principle be strictly adhered to more than half the fight is won.

As to the methods of exacting compensation. I fear that we suffer somewhat from too much devotion to theories, logic and philosophy. There is no one method which will best fit all cases. There are advocates of the principle of exciting competition by offering franchises for sale at public auction. Others believe in a legislative fixation of arbitrary amounts either by way of cash payments or percentages on gross or net receipts. Still others believe in granting to local authorities a certain freedom of barter in arranging terms with those seeking to obtain franchises. On the whole, I favor the last mentioned course, though there are conditions under which it is not desirable.

I think it likely that in the case of a comparatively small, but growing city, where practically no transportation facilities exist, the method of franchise sale at public auction, with a fixed minimum or upset price, might work well. But where, in large cities, like New York, the chief thoroughfares are already preempted; where the existing surface lines are controlled by a monopoly; where the question of transfer facilities practically rules out all newcomers, there can be no such thing as genuine competition. In such cases the local authorities can do much better if given a free hand to bargain in behalf of the city than if compelled to sell at auction. In saying this, however, I am presupposing that the bargaining power shall be vested in either one official or a board of a very few officials o' rather more than the average intelligence and integrity, and upon whom the responsibility for any abuse of power can be fixed with certainty. This can never be done in the case of local legislative assemblies. In most of our cities the local legislatures do not bear the most enviable reputations, and even the best of them are so hampered by legislative conditions as to be inefficient administrators.

Under the provisions of the Greater New York charter the local leg islature, it is true, possesses exclusive power to grant such franchises, but it is provided that any ordinance granting such a franchise "shall on its introduction and first reading be referred by the municipal assembly to the board of estimate and apportionment, who shall make inquiry as to the money value of the franchise or privilege proposed to be granted, and the adequacy of the compensation proposed to be paid therefor, and no grant thereof by the municipal assembly shall be made except on terms approved by vote or resolution of the board of estimate and apportionment."

The practical effect of this provision is to leave to the popular legislative body the power to decide the broad question of whether the public interests demand the granting of a franchise, and also to veto the terms proposed by the board of estimate and apportionment, but the latter board is vested with those powers which may be said to relate to the business or commercial aspect of the proposition.

As the Board of Estimate and Apportionment of the city of New York has always been a more or less efficient body, which has through all the changes of administration generally retained the confidence of the public, this scheme is one which has generally commended itself to students of New York city municipal affairs.

Since the Greater New York consolidation only two grants of franchises have been made under this provision, but the terms of the grants have been decidedly better than those which had previously been obtained by operation of the general railroad law requiring sales of such franchises at public auction.

On December 5, 1899, the Board of Estimate and Apportionment fixed the money value of the franchises sought by the Kingsbridge Railway Company and the Fort George and 11th Avenue Railroad Company as follows:

Four per cent. of the gross receipts during the first five years of operation.

Six per cent. during the second five years.

Eight per cent. during the third five years, and

Ten per cent. during the remaining ten years.

These two franchises affected routes in comparatively undeveloped portions of the city, so that the operation of these railroads will not probably be profitable in the beginning. Nevertheless bsfore the expiration of the 25-year term of the grant it is practically certain that the city will be thickly settled in these localities, and at the end of the term the city will be free to fix new rates of compensation.

It seems to me that such a plan as this comes as nearly as possible to the ideal method of exacting compensation for street railway franchises otherwise than municipal ownership and operation.

There are many important cities of the country which do not possess boards similar in composition to the Board of Estimate and Apportionment, but I know of no reason why in such cases the functions performed in the city of New York by the Board of Estimate and Apportionment should not be performed by either the Mayor or Comptroller of such cities, acting either alone or together. The principal thing is to have the business transaction connected with the granting of such franchises conducted on behalf of the city by the highest type of official possible, and to center the responsibilities so that there can be no escape in case the terms of the grant be manifestly improper. I think it is under such conditions that the best solution of this problem is to be found.

Care of Boilers.

Whatever plan is adopted for securing water to feed the boilers should not interfere with the general plan of feeding at the same rate that the steam is used, so that the water line will remain nearly in the same place at all times.

In every plant where there are two or more boilers, it is sometimes necessary to lay off one of them for cleaning or repairs. In fact, every plant should have an extra boiler to use in case of necessity, and this means whenever it is advisable to clean one of them, as the practice of running boilers almost continuously should be discountenanced on all convenient occasions.

The plan of leaving boilers empty is a good one, provided steam and water are excluded from them. This opinion is based on experience in starting up a boiler that had not been used for fourteen years, for no internal corrosion was found in it, while the external parts were but slightly affected by its long rest. It was set in brick according to common practice, two walls of the building serving as a part of the setting. After it had been thoroughly inspected it was run for several years under as much pressure as a new boiler of equal diameter is usually allowed in this vicinity without calling for repairs except tightening two braces, and probably this was needed before it was laid off.

When boilers are to be left idle for a long time they should be thoroughly cleaned as soot collects and holds moisture, so that corrosion goes on underneath the apparently harmless covering until the plates are ruined. A coat of good paint suitable for iron work will assist greatly in preserving boilers out of use, and as the expense of it is small, it does not pay to neglect it, for good second-hand boilers are frequently wanted by parties who do not care to invest in new ones for reasons of their own; but when corrosion is allowed to eat into the tubes and plates they will soon be fit for the scrap heap only, and are not especially valuable even there.

One advantage of a power pump and a driven well in connection with a good heater is that all of the pumping must be done before the engine is shut down, which means that exhaust steam is passing through the heater, and no cold water can reach the boiler. An injector, says the *Boilermaker*, London, is very convenient in such a plant, because it may be run to fill up the boiler after the engine is shut down.

MR. DWIGHT F. BURRITT, of Boston, has been appointed Superintendent of the Portsmouth (N. H.) Gas, Electric Light and Power Company.

ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

MR. E. G. HOLZER, Superintendent of the Delaware Gas Light Company, of Easton, Pa., has about completed the placing of an 8 inch pipe under the bridge crossing the Delaware river which connects Easton, Pa., with Phillipsburg, N. J.

A CORRESPONDENT forwards the following: "Another step towards the transformation of the Waterloo (Ia.) Gas and Electric Light Company into the Waterloo Gas Electric Company was recently taken at a meeting held in the law office of Dawson & Estey. The stockholders of the old Company first held a meeting at which they perfected plans for the transfer of the stock and property of the same to the new Company. Then a number of those who took stock in the new concern met and after a discussion adopted articles of incorporation which were filed with the County Recorder. The articles provide for the incorporation of the Waterloo Gas-Electric Company, for a period of 20 years. The capital stock of the new Company is placed at $180,000, divided into shares of $100 each. A large part of the stock is already subscribed, and it is the intention of the incorporation to put the balance of the stock on the market monthly in small blocks, so that it may be generally divided among the citizens of Waterloo. The officers of the Company are: Directors, J. H. Leavitt, George McLean, George H. Lichty, C. P. Bratnober, George W. Dawson, C. E. Pickett and E. B. Harriman; President, George McLean; Vice President, J. H. Leavitt; Secretary, H. B. White; Treasurer, W. W. Miller. In the early spring, work will be commenced on plant improvements, the outlines of which are now under careful consideration."

AT the last meeting for 1900 of the Board of Directors of the Hartford City (Conn.) Gas Light Company the usual semi-annual dividend of 4 per cent. was declared. Dollar gas seems to be a profitably popular measure in Hartford.

AT the annual meeting of the shareholders in the Lancaster Gas Light and Fuel Company and the Edison Electric Illuminating Company, of Lancaster, Pa., the officers chosen were: Directors, Jno. D. Skiles, J. C. Carter, H. C. Demuth, W. U. Hensel, D. McMullen, H. M. North, George R. Rohrer, P. B. Shaw, J. Fred. Sener, P. J. Watt, H. S. Williamson, Frank Williamson, N. Milton Woods, J. G. Zook and J. H. Baumgardner; President, J. D. Skiles; Secretary, J. H. Baumgardner; Treasurer, J. C. Carter.

MR. H. M. BUCK, Manager of the Waukesha (Wis.) American Gas Company, has been authorized to make the following announcement respecting a concession in the selling rates: On January 1st, 1901, the price of gas will be reduced from $1.80 to $1.40 per 1,000 cubic feet gross; and the following discount scale, for payment of bills on or before the 10th day of the month in which the bills are presented, will rule: 10 cents off per 1,000 in quantities over 1,000 cubic feet and up to 25,000 cubic feet; 20 cents off, 25,000 to 75,000; 30 cents off, 75,000 to 100,000; over 100,000, 50 cents off. In concluding the notice, Mr. Buck says: "In consideration of this heavy reduction, all bills will be payable at the Company's office by the 10th of the month following that in which the gas was used. Positively no discount allowed after the 10th. When bills are not paid by the 20th of the month the Company reserves the right to discontinue the supply, and a charge of $1 will be made for turning on the gas when the same had been shut off for non-payment of bill. No distinction in price will be made between gas used for illuminating or fuel purposes."

THE Philadelphia *Telegraph* of December 26th contained the following interesting item: "With far-away New Zealand as their objective point three employees of Messrs. R. D. Wood & Co., of this city will leave the Broad street station of the Pennsylvania Railroad to superintend the fulfilment of a big contract the Company has secured in that distant land. The contract is for the erection of a gasholder for the Auckland City Gas Company, the holder to have a capacity of 2,000,000 cubic feet. The material is now en route for Auckland, the ship Star of Australia, chartered by the Messrs. Wood, having sailed on Saturday. The ship's capacity is taxed by the cargo, the material for the holder weighing 2,400,000 pounds. In addition there are on board 500 tons of pipe, made here, which will be laid in the streets of Auckland. The ship is due at Auckland, February 22d, and by the route she goes will have covered 11,000 miles when she reaches her destination. The trusted employees of the Company who will look after the interests of the firm in the far-away land are Jeremiah Beaston, Frank Fitzgerald and William Brown. They go direct to San Francisco by rail, and from there will embark on a steamer for New Zealand, arriving January 22d, a month ahead of the ship carrying the material, which will give them a month in which to have everything in readiness on the arrival of the ship to commence operations."

ON the morning of the 28th ult., the Directors of the Milford (Mass.) Gas Light Company voted to reduce the selling rate, from $2 to $1.70 per 1,000 cubic feet, the concession to date from the 1st inst. It was further agreed that all monthly bills showing the use of $50 worth or over of gas should be discounted by the granting of a rebate of 15 per cent.

MR. CHARLES DORSEY has resigned from the service of the Gas Company of West Chester, Pa., to accept a responsible position in the service of the Jenkintown and Cheltenham (Pa.) Gas Company.

THE proprietors of the New Orleans (La.) Gas Light Company have declared a dividend of $2.50 per share, payable the 15th inst.

MR. V. L. BOXALL has been appointed Manager of the United Electric Gas and Power Company, of Santa Monica, Cal. He succeeds Mr. E. E. Caister, who we understand has taken charge of the manufacturing end of the Santa Barbara (Cal.) Company's affairs.

IT is reported that the Fairbault (Minn.) Consolidated Gas and Electric Company has made an assignment, the assignee being one of its employees—Mr. John Haug.

AT the annual meeting of the Auburn (N. Y.) Gas Light Company the following officers were elected: Directors, E. H. Avery, J. C. Reed, D. M. Dunning, F. E Hughitt, J. W. Dunning, N. B. Eldred, George B. Turner, S. E. Payne and D. M. Dunning, Jr.; President, E. H. Avery; Vice-President, N. B. Eldred; Secretary, Treasurer and Superintendent, D. M. Dunning.

A CORRESPONDENT incloses the following clipping from the Cincinnati *Commercial Tribune* dated December 24th: "The Cincinnati Gas Company has sent to its stockholders an official notice of the increase in capital stock and also how it will be distributed. The stock will be deliverable at par on January 28, 1901, or within 10 days thereafter, to stockholders of record December 19, interest to be added on all payments delayed beyond December 31. Of the new stock $5.55 will be issued to holders of each share of stock, being the ratio of 1 share to 18. For fractional amounts no scrip will be issued, but in lieu thereof cash payments will be made, commencing January 28th at the assumed market rate of $190 per share. The fractional shares thus acquired will afterward be converted into full shares, sold in the open market, and the proceeds reconveyed into the Treasury of the Company. January 10th another notice will be sent to the stockholders notifying them just how much cash will be required from each person; also the number of shares or amount of check returnable."

IN our prior mention of the petition for the dissolution of the Central Gas Light Company, of San Francisco, Cal., it was stated that the formal proceedings were of a distinctly nominal character, the "Company having been consolidated with the old San Francisco Gas Light Company something like 5 years ago." While the proceedings were of a nominal nature, and although the Company had been absorbed by another one the "absorber" was not rightly named by us, as the following lines from a correspondent will show: "* * * The plant of the Central Gas Light Company was leased to the Pacific Gas Improvement Company many years ago, the consideration being a dividend of 4 per cent. per annum on the capital stock of $2,000,000, some of which stock was owned by the promoters of the Pacific Gas Improvement Company. A few months ago the balance of this stock was absorbed in exchange for bonds issued by the Pacific Gas Improvement Company, thus placing the latter Company in full possession of the works and the franchise. There being no longer any excuse for the existence of the Central Gas Light Company, the courts have been asked for a legal dissolution of the corporation. This is not the first organization of the kind in this city to pass out of existence, and there will be others before the end is reached."

(*Concluded on page* 14.)

THE AMERICAN GAS LIGHT JOURNAL

A. M. CALLENDER & CO.,
PROPRIETORS.

THOS. J. CUNNINGHAM,
ELBERT P. CALLENDER,
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CHAS. E. SANDERSON,
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AGENTS:

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England—Aug. Siegle, 30 Lime Street, London.

MONDAY, JANUARY 7, 1901.

(*Continued from page* 13.)

THE American Gas Company, of Philadelphia, has signalized its complete accession to the properties of the Kingston (N. Y.) Electric Company, which ownership includes the direction of the gas supply of the city, by announcing a new schedule of selling rates, the same to be effctive from the first of the year. Under the scheme these charges will prevail: The Kingston Electric Company will hereafter charge a uniform rate for gas, irrespective of the purpose for which it is used. For all gas consumed bills will be rendered at $1.50 per 1,000 cubic feet, subject to a discount of 10 cents per 1,000 cubic feet upon all bills paid at the office of the Company before the 10th day of the month in which the bill is presented. Fifteen cents per 1,000 watts will be charged for electric current, with the discounts, payable on the 10th day of the month in which the bill is presented, as follows: On monthly bills less than $25, 10 per cent.; from $25 to $50, 20 per cent.; $50 and over, 30 per cent.

THE Southern Pacific Railroad Company has completed, at Los Angeles, Cal., a plant of the Pintsch type, for the manufacture of oil gas for the lighting of its passenger coaches. The plant has a capacity of 30,000 cubic feet per day, and it is under the supervision of Mr. Sherman W. Wiggins.

THE authorities of Kingston, Ontario, have served notice on the owners of the Kingston Light, Heat and Power Company of their intention to proceed, under the terms of an agreement existing between the city and the Company, to fix by arbitration a purchase price for the Company's gas and electric lighting plants. It is thought that a fair valuation of the properties would be not less than $280,000.

THE Committee on Light of the Richmond (Va.) City Council is vigorously struggling with the proposition to reduce the gas rate to 80 cents per 1,000 cubic feet. In the hearings so far the fact was shown beyond doubt that at the current rate ($1 per 1,000 cubic feet) the city earned last year the interest on the bonded debt for which the works is responsible, and a surplus of $47,000.

THE Consumers Gas Company, of Reading, Pa., has announced a concession in the selling rate. Under the new rule the charge is to be $1.50 per 1,000 cubic feet, gross, less 10 per cent. for prompt payment. The old rate was $2 per 1,000, less 20 per cent. for prompt payment.

THE Board of Selectmen of Andover, Mass., have seemingly determined to permit the Lawrence Gas Company to supply that place with gas, despite the application of certain residents of Andover for a franchise. In any event the Selectmen have submitted to the Lawrence Gas Company the terms of a governing franchise for the Company's approval and acceptance. The 6th section of the franchise reads: "The Lawrence Gas Company agree that the town of Andover may purchase such portion of their plant, pipes, works and *franchises* as may at any time be located within the limits of the town of Andover upon a fair valuation thereof, if at any time the town of Andover shall have a legal right so to do, and in case the town shall purchase as above, the rights of location shall not be considered as of any monetary value." There is no doubt that in this specific instance that franchise is worth considering when it comes to estimating or valuing the same. Under the circumstances it looks that the advocates of the Lawrence Gas Company did a wise thing when they accepted the hardship of accepting a franchise valuation, and submitted to a waiving of any "rights" of location from a monetary point of view. It is undeniable, however, that, if Andover is to have a gas supply, such supply would be far better rendered were it to come from the mains of the Lawrence Gas Company than from any crudely devised and operated home plant.

A SCHEME is under way whereby the residents of Rockville Center, Lynnbrook, East Rockaway, Hewlett's and Woodmere, L. I., may obtain gas. The promoters are residents of Baldwins, L. I., and their reasoning seems to have merit behind it.

THE Lowell (Mass.) Gas Light Company enjoyed the most prosperous year in its history with the year that closed the century. Good luck to the concern that in the history of the gas industry of America always believed in the good that came from selling gas cheaply.

THE peculiar gentleman who controls the fortunes of the Covington (Ky.) Gas Light Company has scored another victory. The Council of that city, after a series of legal skirmishes and line-to-line contests, which would have daunted a less doughty foe, have yielded to Mr. Shinkle. Of course, it is likely Mr. Shinkle will admit that Lieutenant Cline did a bit of successful work in the campaign. Under the agreement, as near as one at this distance in quick time can figure it, the Covington Company for the next 20 years has the right to sell gas in that city at a rate not to exceed $1 per 1,000 cubic feet.

M. JACKSON, C. M. Crowell, G. E. Chalfant and others want to construct a gas works in Hammonton, South New Jersey.

The Market for Gas Securities.

The week was noted for many eccentricities in the dealings on the Exchange. Strength was the prevailing characteristic up to Thursday, when a sharp break in the traders' favorite foot ball, American Sugar Refineries, unsettled the whole list. Of course, the real connection between sugar and gas is nil, but when it comes to speculation all shares seem to have close kinship; and with the break in sugar down went Consolidated.

The opening to-day (Friday) in it was at 191 to 191½, and the closing was 193 to 193½. If there is anything of value in increased trading to cause a stock to advance then there are many reasons why Consolidated should soar, for the business that it is doing is simply tremendous, the increase in output north of the Harlem river being nothing short of wonderful.

Mister Donnelly has introduced his municipal gas works bill to the attention of his associates in the Legislature, but there is not a possibility that anything will come of it. With the first of the year the legal gas rate in New York and Brooklyn reached the $1 per 1,000 limit, under the operation of what is known as the Wray bill, and well may one imagine that the rate will prevail until the new works at Astoria are built. New York City gas bonds are in good demand.

The slump in the general market naturally affected about all the gas share list, save Brooklyn Union, which is very strongly held.

Peoples, of Chicago, was quite a sufferer, as our comparison of quotations for the weeks will show. It closed to-day at 104, bid.

Bay State has managed to get above the "1" mark.

Consolidated, of Baltimore is quoted at 59½ to 60½, and we strongly advise its purchase.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.

16 WALL STREET, NEW YORK CITY.

JANUARY 7.

☞ All communications will receive particular attention.

☞ The following quotations are based on the par value of $100 per share.

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked.*
Consolidated	$54,595,200	100	193	193½
Central Union, Bonds, 5's	3,000,000	1,000	108½	109½
Equitable Bonds, 6's	1,000,000	1,000	105	..
" 1st Con. 5's	2,300,000	1,000	120	..

Metropolitan Bonds	658,000	..	108	112
Mutual	3,500,000	100	295	299
" Bonds	1,500,000	1,000	100	102
Municipal Bonds	750,000	..	..	..
New Amsterdam Gas Co. .. Bonds, 5's	11,000,000	1,000	108¼	109
Northern Union, Bonds, 5's.	1,250,000	1,000	104	104¼
New York and East River .. Bonds 1st 5's	3,500,000	1,000	106	106⅜
" 1st Con. 5's	1,500,000	..	115	.
Richmond Co., S. I.	348,650	50	70	..
" Bonds	100,000	1,000	..	..
Standard	5,000,000	100	131	133
Preferred	5,000,000	100	151	153
Bonds, 1st Mortgage, 5's	1,500,000	1,000	116	114
Yonkers	299,650	500	130	..
Out-of-Town Companies.				
Brooklyn Union	15,000,000	100	178	180
" " Bonds (5's)	15 000,000	1,000	118	119
Bay State	50,000,000	50	1¼	1⅜
" Income Bonds	2,000,000	1,000	..	75
Binghamton Gas Works	450,000	100	30	40
" 1st Mtg. 5's	503,000	1,000	96½	99½
Boston United Gas Co.— 1st Series S. F. Trust	7,000,000	1,000	82	85
2d " " "	3,000,000	1,000	47½	50
Buffalo City Gas Co.	5,500,000	100	7	9
" " Bonds, 5's	5,250,000	1,000	68	71
Capital, Sacramento	500,000	50	..	35
Bonds (6's)	150,000	1,000	..	..
Central San Francisco	2,000,000	..	106	108
Chicago Gas Co. Guaranteed Gold Bonds	7,650,000	1,000	104	104¼
Cincinnati G. & C. Co.	8,500,000	100	194	198
Columbus (O.) Gas Co., 1st Mortgage Bonds	1,500,000	1,000	106	107
Columbus (O.) Gas Lt. & Heating Co	1,682,750	100	60	65
Preferred	3,026,500	100	84	86
Consumers, Jersey City Bonds	600,000	1,000	102	103
Consumers, Toronto	1,700,000	50	215	216
Consolidated, Baltimore	11,000,000	100	59⅞	60½
Mortgage, 6's	3,600,000	..	..	118
Chesapeake, 1st 6's	1,000,000	..	..	..
Equitable, 1st 6's	910,000	..	..	..
Consolidated, 1st 5's	1,490 000	..	..	112
Consolidated Gas Co. of N.J.	1,000,000	100	12	16
" Con. Mtg. 5's	380,000	1,000	80	85
Consolidated G. & E. Co.'s, Little Falls, N.Y.	90,000	100	..	100
Bonds	75,000	..	..	100
Detroit City Gas Co	4,560,000	50	95	97
" Prior Lien 5's	4,737,000	1,000	99½	100
Detroit Gas Co., 5's	381,000	1,000	100	101
" Inc. 5's	16,000	100	94	94½
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000	..	101
Essex and Hudson Gas Co.	6,500,000	..	35	40
Fort Wayne	2,000,000	..	35	41
" Bonds	2,000,000	..	60	64
Grand Rapids Gas Lt. Co.	1,000,000	50	100	105
" 1st Mtg. 5's	1,225,000	1,000	..	..
Hartford	750,000	25	240	250
Hudson County Gas Co., of New Jersey	10,500,000	..	25	..
" Bonds, 5's	10,500,000	..	101	103
Indianapolis	2,000,000	..	50	60
" Bonds, 6's	2 650,000	..	89	93
Jackson Gas Co	250,000	50	70	75
" 1st Mtg. 5's	265,000	1,000	101	102½
Kansas City Gas Light Co., of Missouri	5,000,000	100	..	36
Bonds, 1st 5's	3,822,000	1,000	101½	103
Laclede, St. Louis	8,271,000	100	70	74
Preferred	2,500,000	100	95	98
Bonds	10,000,000	1,000	107	107⅛
Lafayette Gas Co., Ind.	1,000,000	100	40	50
Bonds	1,000,000	1,000	60	65
Louisville	2,570,000	50	110	120
Madison Gas & Elec. Co.	400,000	100	62	66
" 1st Mtg. 6's	350,000	1,000	102½	108
" 6 per cent. scrip, due 1901	100,000	25	87	89
Montreal, Canada	2,000,000	100	182	184⅜
Newark, N. J., Con. Gas Co	6,000,000	..	..	55
Bonds, 6's	4,600,000	..	..	108
New Haven	1,000,000	25	280	300
Nashville Gas Lt. Co.	1,000,000	50	110	..
Oakland, Cal.	2,000,000	..	46	47
" Bonds	750,000	..	..	..
Peoples G. L. & Coke Co., of Chicago	25,000,000	100	104	104¼
Peoples Gas Lt. & Coke Co., Chicago, 1st Mortgage	20,100,000	1,000	90¾	91
2d "	2,500,000	1,000	104	105
Rochester Gas & Elec. Co.	2,150,000	50	88	..
Preferred	2,150,000	50	118	..
Consolidated 5's	2,000,000	..	87½	90
San Francisco, Cal.	10,000,000	100	47¼	47⅛
St. Paul Gas Light Co.	1,500,000	100	47	50
1st Mortgage 6's	650,000	1,000	82	85
Extension, 6's	600,000	1,000	..	..
General Mortgage, 5's	2,465,000	1,000	88	90½
St. Joseph Gas Co	1,000,000	100	31	34
" 1st Mtg. 5's	750,000	1,000	96⅜	98
Syracuse, N. Y.	1,750,000	100	9	11
Bonds	1,612 000	1,000	88½	93
Washington, D. C	2,600,000	20	273⅛	273¼
First mortgage 6's	600,000	..	..	..
Western, Milwaukee	4,000,000	100	97	99
Bonds, 5's	3,830,500	..	107	107½
Wilmington, Del.	600,000	50	200	201

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OFFICE OF THE UNITED GAS IMPROVEMENT CO.,
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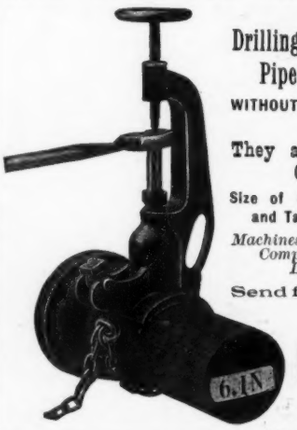

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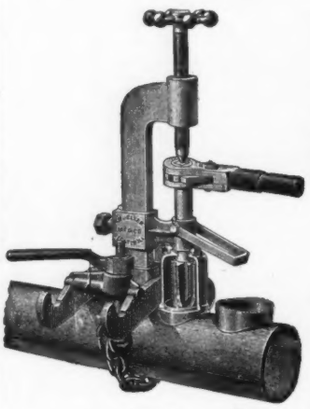

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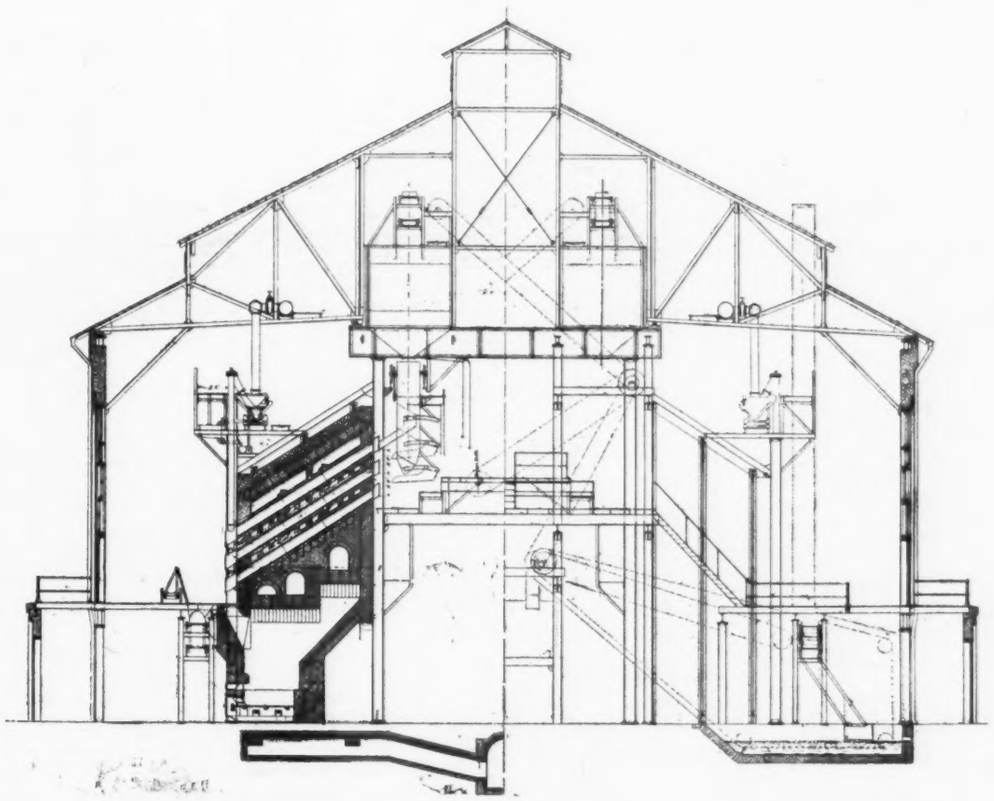

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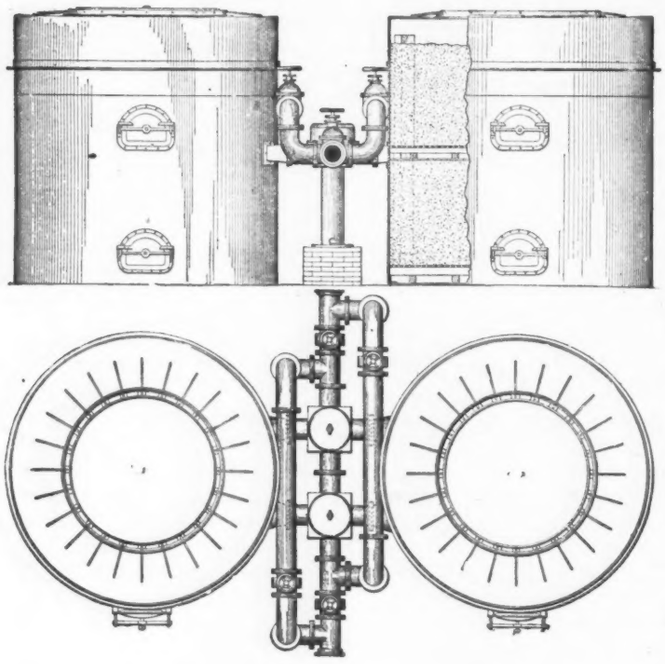

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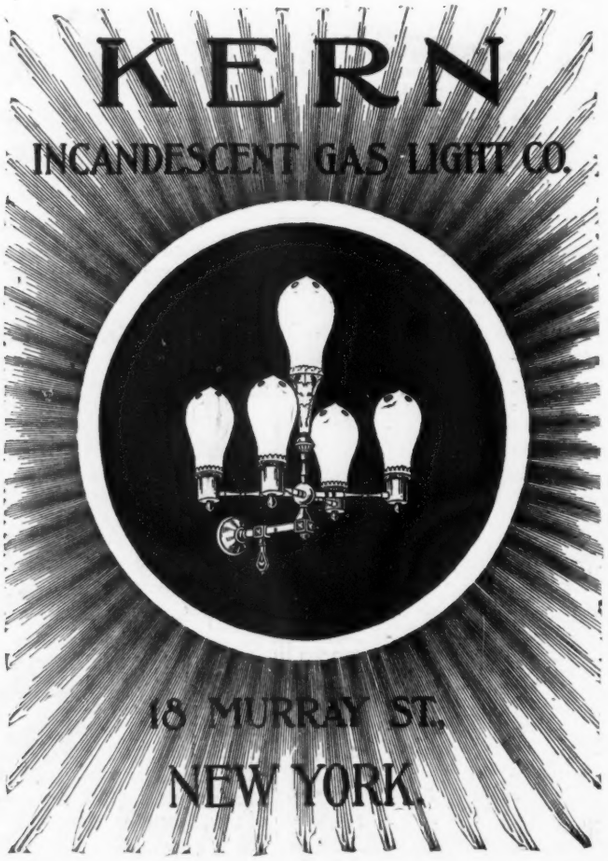

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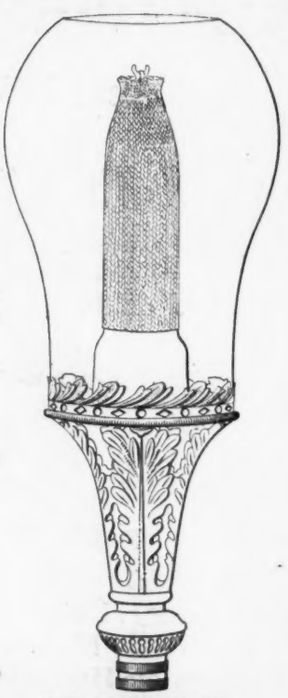
"	3	"	3	"	105	"
"	4	"	4	"	140	"
"	7	"	7	"	225	"



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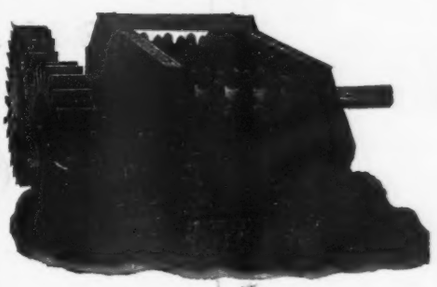

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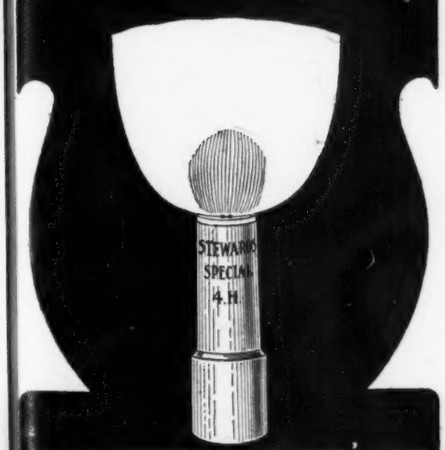

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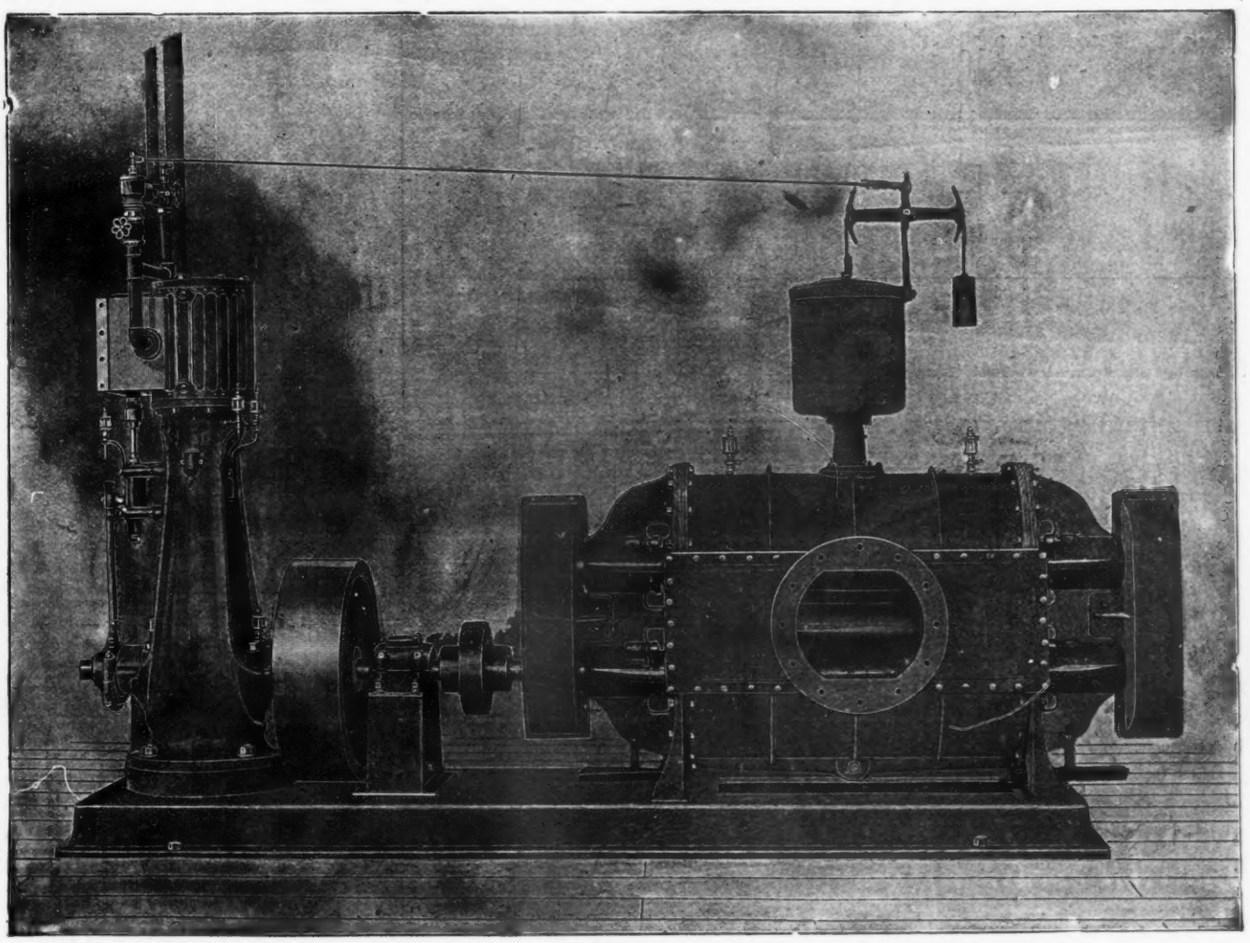

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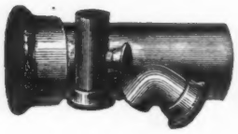

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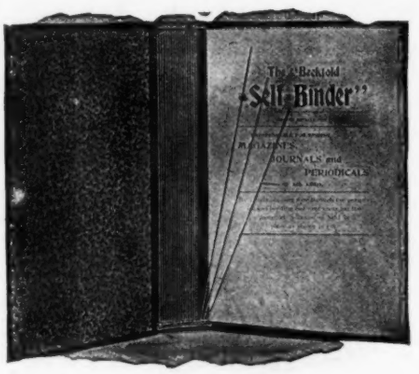

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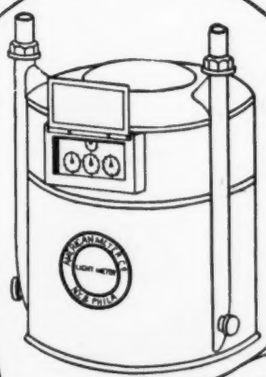

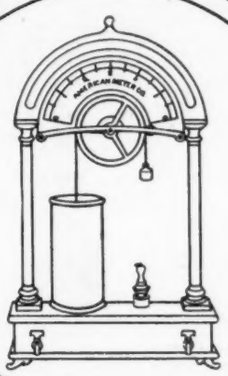

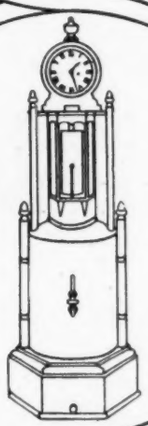

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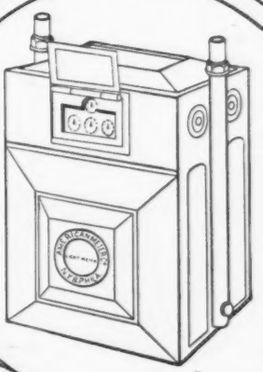
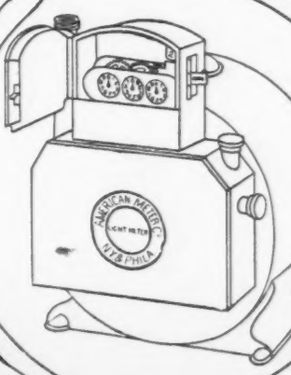




PUBLIC LIGHTING TABLE.

JANUARY, 1901.

Day of Week.	Table No. 1. Following the Moon.			Table No. 2. New York City. All Night Lighting.	
	Date.	Light.	Extinguish.	Light.	Extinguish.
				P.M.	A.M.
Tue.	1	3.50 AM	6.20 AM	4.30	6.30
Wed.	2	4.50	6.20	4.30	6.30
Thu.	3	No L.	No L.	4.30	6.30
Fri.	4	No L. FM	No L.	4.30	6.30
Sat.	5	No L.	No L.	4.30	6.30
Sun.	6	5.20 PM	8.00 PM	4.30	6.30
Mon.	7	5.20	9.00	4.30	6.30
Tue.	8	5.20	10.00	4.40	6.30
Wed.	9	5.20	11.00	4.40	6.30
Thu.	10	5.20	12.00	4.40	6.30
Fri.	11	5.20	12.50 AM	4.40	6.30
Sat.	12	5.20 LQ	1.50	4.40	6.30
Sun.	13	5.30	2.50	4.40	6.30
Mon.	14	5.30	3.40	4.40	6.30
Tue.	15	5.30	4.40	4.50	6.25
Wed.	16	5.30	5.40	4.50	6.25
Thu.	17	5.30	6.20	4.50	6.25
Fri.	18	5.30	6.20	4.50	6.25
Sat.	19	5.30	6.20	4.50	6.25
Sun.	20	5.40 NM	6.20	4.50	6.25
Mon.	21	5.40	6.20	4.50	6.25
Tue.	22	5.40	6.20	5.00	6.25
Wed.	23	5.40	6.20	5.00	6.25
Thu.	24	5.40	6.20	5.00	6.25
Fri.	25	10.20	6.20	5.00	6.25
Sat.	26	11.30 FQ	6.20	5.00	6.25
Sun.	27	12.40 AM	6.10	5.00	6.25
Mon.	28	1.50	6.10	5.00	6.25
Tue.	29	2.50	6.10	5.05	6.15
Wed.	30	3.40	6.10	5.05	6.15
Thu.	31	4.30	6.10	5.05	6.15

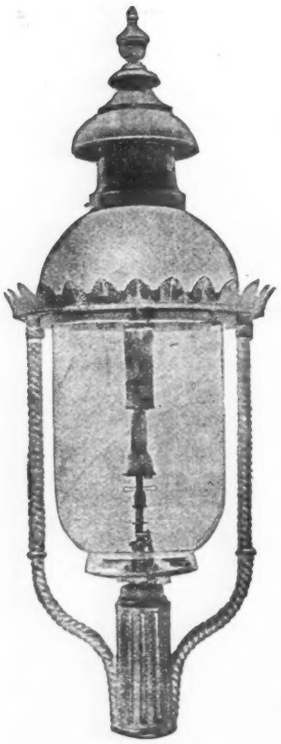
TOTAL HOURS LIGHTING DURING 1901.

By Table No. 1.	Hrs. Min.	By Table No. 2.	Hrs. Min.
January	220.10	January	423.20
February	192.30	February	355.25
March	180.00	March	355.35
April	158.30	April	298.50
May	140.40	May	264.50
June	135.40	June	234.25
July	138.00	July	243.45
August	156.20	August	280.25
September	174.40	September	321.15
October	202.30	October	374.30
November	220.40	November	401.40
December	241.30	December	433.45
Total, yr.	2161.10	Total, yr.	3987.45

NEW YORK, 33 Nassau St. PHILADELPHIA, Broad and Arch Sts. CHICAGO, 54 Lake St.

Welsbach Street Lighting Company

.... OF AMERICA ....



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Which includes its specially DESIGNED AND PATENTED BURNER for STREET and PARK LIGHTING exclusively.

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POINTS OF MERIT:

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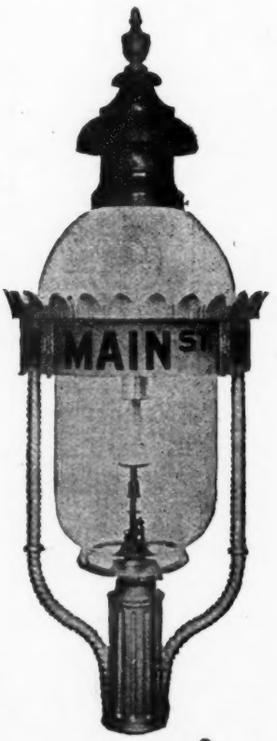
IT LIGHTS THE STREET.

Where there are no gas mains we can furnish an equally good light by our SELF-GENERATING NAPHTHA WELSBACH BURNER, and thereby supply a uniform light in all localities.



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OF INCANDESCENT

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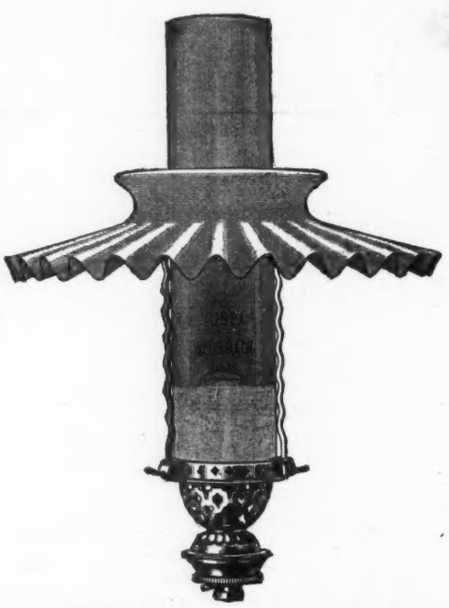
EVER EXHIBITED.



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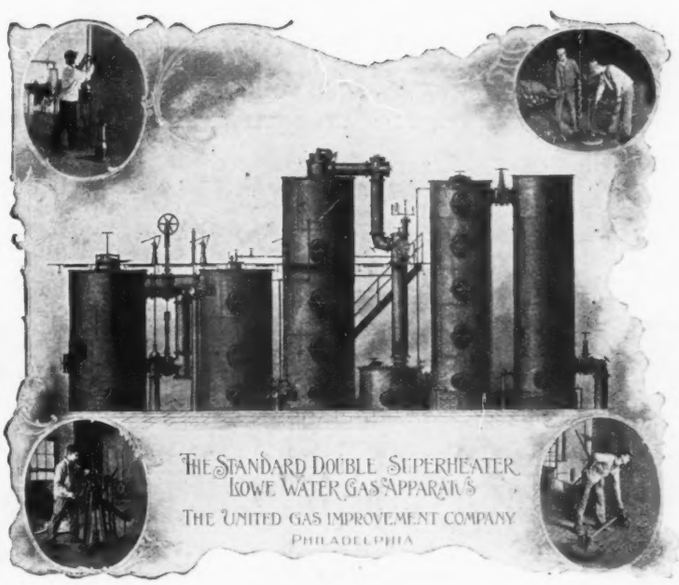
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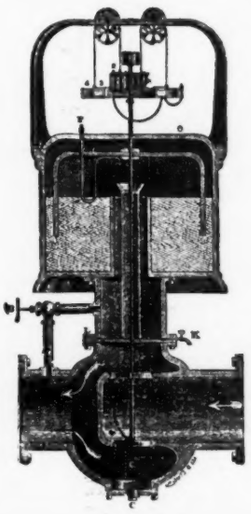

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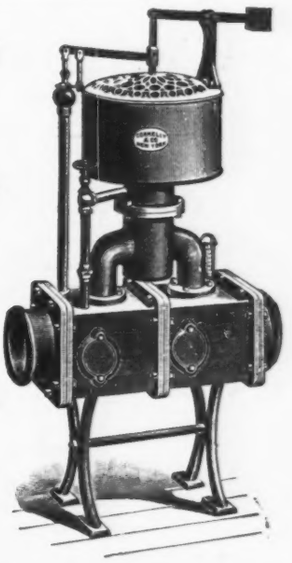

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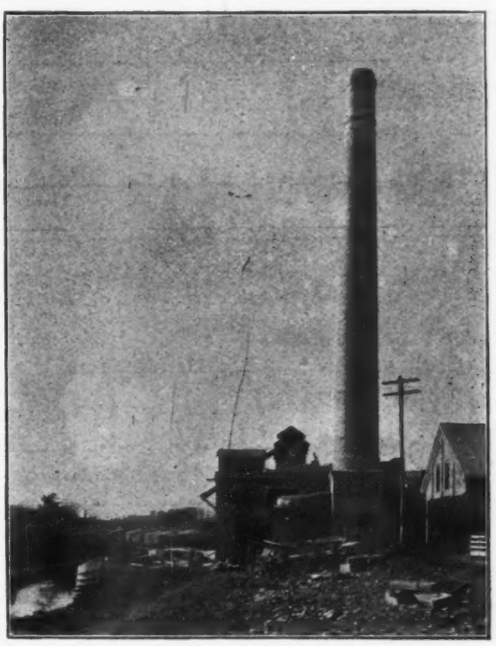

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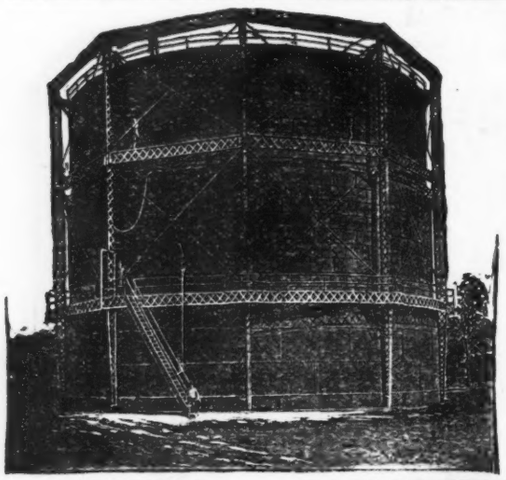

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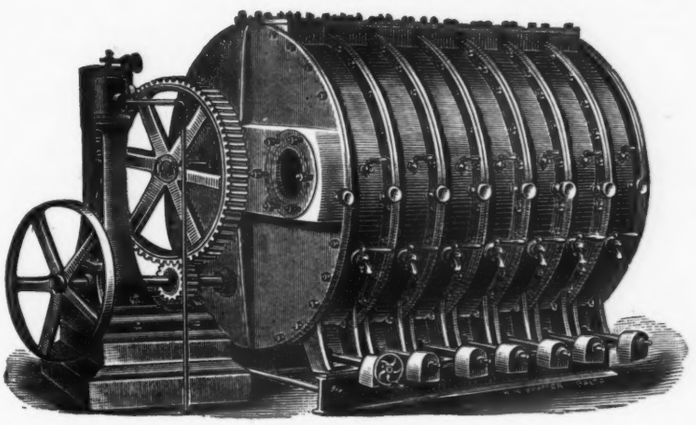

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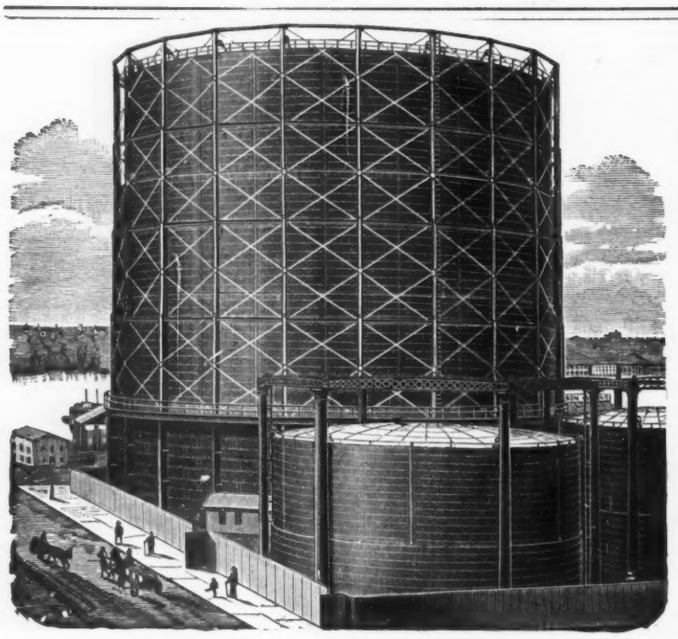

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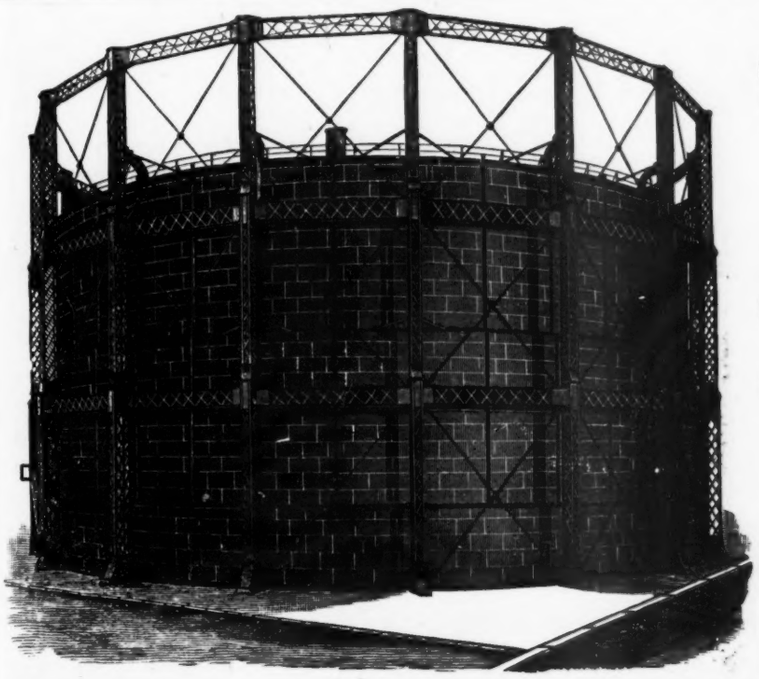

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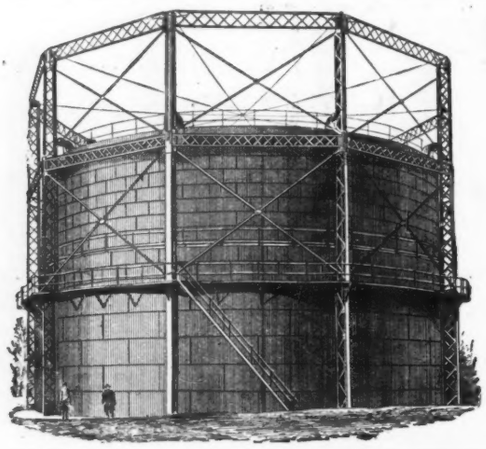

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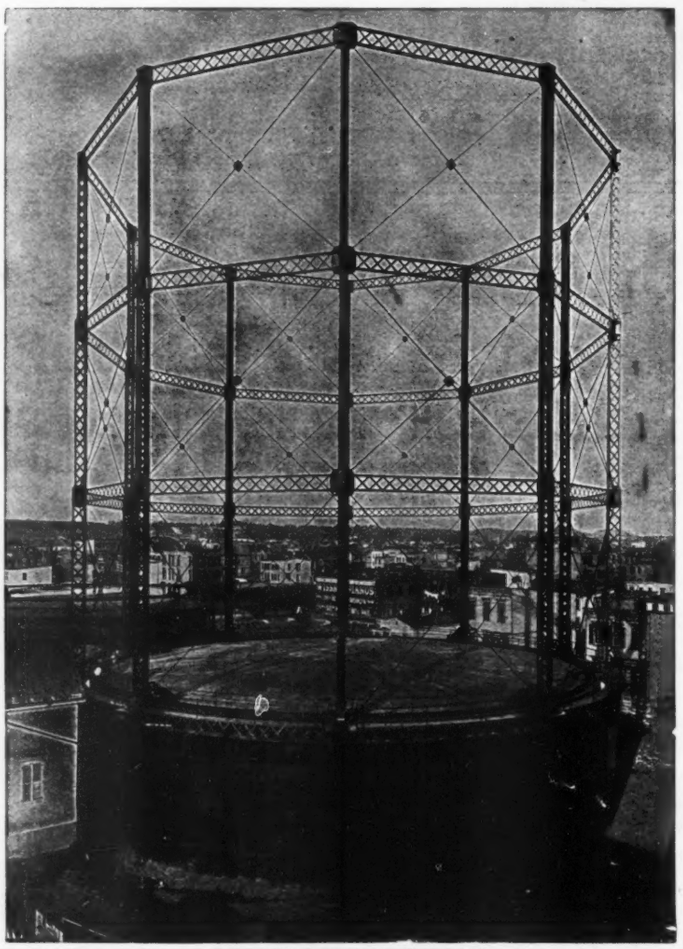

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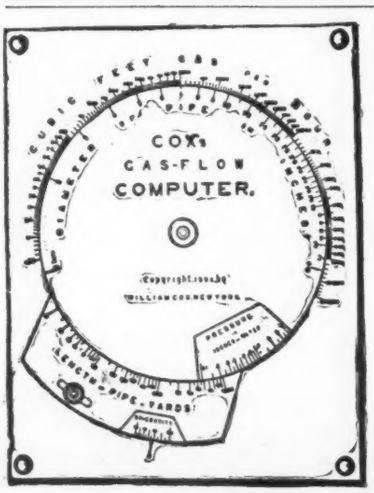

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